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# Identifying Emotional Intelligence And Metacognition In Medical Education

Robert Weigand  
*University of New England*

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IDENTIFYING EMOTIONAL INTELLIGENCE AND METACOGNITION  
IN MEDICAL EDUCATION

By

Robert Weigand

BA Ricker College 1977  
MS Assumption College 1979

A DISSERTATION

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Submitted in Partial Fulfillment of Requirements

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## IDENTIFYING EMOTIONAL INTELLIGENCE AND METACOGNITION IN MEDICAL EDUCATION

### ABSTRACT

An extensive literature review identified emotional intelligence and metacognition had not been examined in medical education as integrated concepts in the reflective practice of medical residents. Continued research into the independent application of these concepts in medical education maintains a perspective that has permeated medical literature for 20 years. Research into emotional intelligence and metacognitive functioning and its' influence on reflective practice in medical education acknowledges the need for more taxonomies of knowledge and skills. A quantitative correlational study was conducted utilizing Family Practice residents. Three valid and reliable assessment tools identified as the MSCEIT, MAI and Groningen were used in this study to determine emotional intelligence, metacognitive ability and reflective ability in Family Practice residents. Findings did not refute the null hypothesis identified as no statistical relationship exists between emotional intelligence and metacognition. Scores between males and females in emotional intelligence appeared descriptively different but not statistically significant. Emotional intelligence and metacognition did not predict strength in reflective ability based on residency year. Descriptive findings indicated female residents scored higher in perceiving emotions while male residents scored higher in thinking about their feelings. Female Family Practice residents scored higher than male Family Practice residents in metacognition each residency year. Females also scored higher than males in reflective practice in each of the three residency years. The small sample size in this study was an acknowledged

limitation. Additional qualitative and quantitative research needs to be conducted to learn more about the integration of these three concepts in medical education.

Doctor of Education  
Educational Leadership

This dissertation was presented  
by

Robert Weigand

It was presented on  
August 22, 2017  
and approved by:

Carol Burbank, Ph.D., Lead Advisor  
University of New England

Shelley McClure, Ed.D, Secondary Advisor,  
University of New England

Jill Stoltzfus, Ph.D., Affiliate Committee Member

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## Table of Contents

### Chapter One

Introduction.....	1
Problem Statement.....	5
Purpose.....	5
Research Setting.....	6
Research Questions.....	6
Conceptual Framework.....	7
Assumptions, Limitations, Scope.....	8
Significance.....	9
Conclusion.....	10

### Chapter Two

Literature Review.....	11
Emotional Intelligence .....	15
Emotional Intelligence in Medicine.....	16
Rationale for Educating Physicians in Emotional Intelligence.....	18
Emotional Intelligence in Medical Students.....	19
Emotional Intelligence in Residents.....	20
Emotional Intelligence and Gender Differences in Residents.....	22
Emotional Intelligence in Sub-Specialty Residents.....	22
The call for future research of Emotional Intelligence in Medical Residency	
Training.....	23
Metacognition.....	24



Knowledge of Task.....	25
Knowledge of Strategy.....	25
Metacognitive Regulation.....	26
Metacognition in Medicine.....	26
Metacognition Skills in Residents and Medical Students.....	27
Metacognition and Communication.....	28
Assessing Metacognition.....	28
Conceptual Framework.....	29
Summary.....	30

### Chapter Three

Methodology.....	31
Research Method and Design.....	32
Research Questions and Hypotheses.....	32
Instruments.....	33
Validity and Reliability.....	34
Study Setting and Participants.....	35
Participation Sample.....	36
Study Conduct.....	37
Informed Consent.....	37
Confidentiality.....	38
Procedures for Data Collection.....	38
Procedures for Data Analysis.....	40
Potential Limitations.....	41

Ethical Considerations .....	41
Chapter Four	
Research Results.....	43
Statistical Analysis.....	44
Research Question One.....	45
Research Question Two.....	46
Research Question Three.....	47
Descriptive Analysis of Branch MSCEIT Scores.....	48
Descriptive Analysis of MAI Scores.....	52
Descriptive Analysis of Groningen Assessment.....	53
Summary of Findings.....	54
Chapter Summary.....	57
Chapter Five	
Conclusion and Recommendations.....	58
Research Questions.....	58
Analysis and Statistical Concerns.....	59
Conclusion.....	60
Limitations.....	64
Suggestions for Future Research.....	65
Conclusion.....	67
References.....	68

Research Study, Participants, Information, Confidentiality Protection.....	78
Appendix.....	78

## List of Tables

Table 1. Score Values by Gender and Residency Year.....	44
Table 2. Multivariate Direct Linear Regression of Independent Predictors of Self Reflection (Groningen Score).....	47
Table 3. MSCEIT Branch Mean Scores First Year Family Practice Residents.....	50
Table 4. MSCEIT Branch Mean Scores Second Year Family Practice Residents.....	51
Table 5. MSCEIT Branch Mean Scores Third Year Family Practice Residents.....	51
Table 6. MAI Mean Scores by Residency Year and Gender.....	52
Table 7. Groningen Mean Scores by Residency Year and Gender.....	53

## **Chapter 1**

### **Introduction**

Medical residency education programs throughout the United States in the early 1990's paid minimal attention to providing curriculum described as "professional development" (Coulehan, Williams, 2003 p. 598). Educators in medical residency education programs during that time "assumed that professional values, which included interpersonal communication, would just happen over a period of time for the resident" achieved by modeling the behavior of mentors and role models responsible for residency education (Coulehan, Williams, 2003 p. 599). Manson (1994), Petersdorf (1992) & Wear (1998) concluded in their research that medical education was not successful in fostering the development of medical residents' professional behavior utilizing a modeling approach. This type of training produced technically prepared residents rather than "compassionate" physician's (Coulehan & Williams, 2001 p. 603).

The Accreditation Council for Graduate Medical Education (ACGME) responded to this dissatisfaction and underscored the importance of these skills by establishing core competency requirements in all graduate medical education programs (1999). These core competencies include: patient care, medical knowledge, professionalism, systems based practice, interpersonal and communication skills. Development of these competencies while in residency prepares the physician for the ever changing world of health care delivery. Residency training programs around the country now aspire to develop physicians who have a wide scope of clinical skills and the ability to be emotionally responsive to patients (Arora, Russ, Petrides, Sirimanna, Aggarwal, Darzi, Sevdalis, 2010). The new environment of patient care requires excellence in clinical care and academic performance (Chan, Petrisor, Bhandari, 2013).

The development of reflection before action has not been an element of residency education. Fadiman (1997) wrote “the failure of reflection does an excellent job of removing medical students from their emotions” (Fadiman, 1997 p. 82). Recognizing a process of being emotionally disconnected from patient’s feelings some residents have been identified as taking a “clinically detached” approach in the practice of medicine (Coulehan, 1995 p. 222). It is said that medical knowledge doubles every seven years (Kaul, 2004) therefore the need to become a life-long learner as a physician includes the adoption of new interpersonal reflective skills. More than a decade ago, minimal attention was paid to the concept of professionalism in medical education curriculum (Coulehan & Williams, 2003).

Medical educators did not discuss communication skills in residency training. The ACGME in 1999 (as cited in Arora, et al., 2010) sent a clarion call to all residency programs in the country by requiring education and validation of skills by residents and mandating education in the core competencies which include interpersonal and communication skills. This attention to professionalism in academic medicine has become a focal point in the education of all residents in this country (Chan, Petrisor, Bhandari, 2013).

The emergence of two concepts emotional intelligence and metacognition is traced back to 1998 as a strategy to improve the interpersonal skills between residents and patients (Chan, Petrisor, Bhanddari, 2013). Arora et al. (2010) performed a methodical review of the literature which examined sixteen articles identifying the function of emotional intelligence in medicine. The findings of the study indicated a correlation between greater emotional intelligence and the relationship between physicians and patients.

Emotional intelligence describes how an individual manages his/her own emotions and the emotions of others (Mayer & Salovey, 1997 p.3). A literature review of emotional

intelligence in a clinical setting indicated application of emotional intelligence to interpersonal skills and communication, patient care, professionalism, medical knowledge and practiced learning and improvement (Arora et al., 2010). This was reported (Arora et al., 2010) as the first published work referencing emotional intelligence to ACGME competencies of communication and interpersonal skills. Metacognition is “thinking about thinking” (Eichbaum, 2014 p. 64). Medicine requires learners capable of acquiring new knowledge and skills from experience (Quirk, 2006). Dunphy et al. (2010) identified the growing emergence of metacognitive theory in medical education literature as a potential model for understanding the clinical reasoning process.

Weng et al. (2011) suggested a need for continued research into the dynamics of physician-patient relationships and specifically the need to understand empathy and relationships where emotional intelligence is practiced. The work of Arora et al. (2010) called for the continuation of research of emotional intelligence in light of the growing evidence of emotional intelligence being incorporated into physician training (Grewal & Davidson, 2008; Pilkington, Hart & Bundy, 2012). Dunphy et al. (2010) identified the growing emergence of metacognitive theory in medical education literature as a potential model for understanding the clinical reasoning process. Additionally, medical student performance on the objective structured clinical examination (OSCE) afforded an opportunity to apply the concept of metacognition to test taking anxiety (Brannick, 2013) but did not include an emotional intelligence component or reflective practice in the study.

The review by Arora et al. (2010) identified greater emotional intelligence correlated positively with improved relationships between physicians and patients, empathy, teamwork and communication skills. An extensive literature review revealed no research currently exists

identifying the integration of emotional intelligence and metacognition as a reflective practice in medical residency education. (Grewal & Davidson, 2008; Pilkington, Hart & Bundy, 2012). The continued publication of emotional intelligence and metacognition research as independent concepts in medical education sustains a research approach that has permeated medical education literature for 20 years. Additional research in medical education to examine the concepts of emotional intelligence and metacognition examined independently of each other only fosters a continued research practice. Examining metacognition and emotional intelligence as integrative concepts, functioning together in the development of a resident physicians' relational skills affords an entirely new approach to this field of study in medical education.

The potential reach of this research is significant. The study examined medical residency education with attention to an integrative educational approach toward the potential synergism between metacognitive and emotional intelligence skill development in residency education. The study was necessitated by the call for new initiatives to progress the teaching of professionalism in medical education (Epstein, Hundert, 2002). The focus of this study identified the integration of emotional intelligence and metacognition as a reflective practice in medical residency training. These were examined as interpersonal skills in a medical residency program.

A transformative leadership perspective of this study identified a need to ultimately improve the quality of patient care as an outcome of improving the medical education of residents. Within the core values of equity and social justice (Shields, 2010) are the emboldened efforts of transformative leadership. The desire of this transformative healthcare leader is to improve the quality of life for others.



## **Problem Statement**

The researcher had speculated integrated research has not been pursued for several reasons. First, an integrated approach required a research design incorporating the assessment of emotional intelligence and metacognition utilizing a quantitative methodology. To date, this researcher has not located a study which attempted this research methodology. One contributing element to this problem is disagreement in how emotional intelligence is assessed. Currently, there are a minimum of three different assessment tools being utilized in the assessment of emotional intelligence. Second, and to emphasize the previous point, reliability and validity of assessment instruments applied to previous independent studies in emotional intelligence and metacognitive has been challenged.

This researcher addressed this problem by utilizing only assessments which have demonstrated reliability, validity and standardization. Third, no previous research interest in medical education pursued the potential correlation between emotional intelligence and metacognition in medical education. Breaking through these limitations required a solid research design methodology utilizing statistically valid and reliable assessment instruments. Research into metacognitive functioning acknowledged the need for more taxonomies of knowledge and skills (Veenam et al., 2006). There is a lack of research supporting this integration.

## **Purpose**

The purpose of this prospective, quantitative study was to examine the potential relationship between emotional intelligence and metacognition and their influence on the reflective practice of medical residents. Individually, emotional intelligence and metacognition had appeared in the general literature over 40 years and is described by Torracco (2005) as a mature topic. This study introduced an examination of two integrated concepts, emotional

intelligence and metacognition, both have previously been reviewed independently. In healthcare, the challenges to transformative leadership are evident in academic medicine where a malaise (Armstrong, 2007) has set in. Driven by the inability of medical schools to change the time honored sense of traditional values of extoling singular achievement, leadership in medicine has not kept pace with the current collaborative healthcare delivery models (Armstrong, 2007). Academic medicine is not accustomed to speed and efficiency in the delivery of healthcare. The tradition of knowledge about the practice of medicine, held previously by academics, is now opened to technology and is widely available. The rigidly held practices of academic medicine is ensconced in bureaucratic tradition making system changes even more frustrating to those working to change the system (Armstrong, 2007).

### **The Research Setting:**

Family Practice Residents working at a University Health Network in Bethlehem, Pa. and Phillipsburg, N. J. participated in the study. For the purpose of this study, a homogeneous type of sampling was used. This type of sampling identified by Miles & Huberman (1994, p.28) focuses and simplifies the study. The group consisted of both females and males who are residents in a required, three year, Family Practice Residency program. Members of this residency group were in their first, second or third year of residency. All physicians completed medical school and are pursuing completion of the required residency to become board certified and licensed Family Practice medicine physicians. The sample size of the group consisted of 36 medical residents.

## **Research Questions**

Because this study presents a new and emerging topic this integrated research study posed the following questions: When the concepts of emotional intelligence and metacognition are evaluated together, what correlations, if any, are found between emotional intelligence and metacognition in the medical resident? What influence did age, sex and residency year have on the emotional intelligence and metacognitive ability of the resident? What influence did metacognition and emotional intelligence have on the reflective practice of the resident?

## **Conceptual Framework**

The research methodology proposed the study of integration between emotional intelligence and metacognition as reflective practice in medical training. A gap in the literature existed identifying the integration of emotional intelligence and metacognition as a reflective practice in medical residency education. The development of an integrative typology afforded an opportunity to develop a new study. Continued research had the potential to illuminate competencies of the family practice resident which may be manifested in clinical care decisions and communication between the physician and the patient. Assessing these integrative competencies may also illuminate how the lack of these competencies are manifested in clinical decision making and communication between the physician and the patient. The potential development of medical education curriculum to address these competency deficits would be a logical progression into future research post this study.

Increased calls for research in emotional intelligence have been affirmed in medical training (Arora et al., 2010; Grewal & Davidson, 2008; Pilkington, Hart & Bundy, 2012). Freshman & Rubino (2004) identified a continued need for empirical research in the use of emotional intelligence skills in healthcare using both qualitative and quantitative research

methods. Metacognition, when viewed in the healthcare literature, is referenced in clinical teaching settings where talking things out are affirmed metacognitive skills exhibited by the student (Lajoie, 2008). Additional support for the continued study of metacognition in medical education aligned to ACGME competencies has been noted.

Citing prior evidence and knowledge of the ACGME requirements (Webb, A. E., Young, R.A., Baumer, J. G., 2010) as a core competency in clinical training, communication with patients seems a likely competency to focus a metacognitive study. The literature noted Metacognition applied to clinical decision making in medical education has been inadequately researched to date (Iannello, 2015). The study assessed this integration utilizing a quantitative methodology. All quantitative data was analyzed using IBM SPSS statistics for windows, version 23 (Armonk, NY: IBM Corp).

### **Assumptions, Limitations, Scope**

Limitations included a homogeneous sample of Family Practice Residents who all work for the same healthcare network. The sample size totaled 36 residents. This sample size afforded more statistical significance to the results. The Family Practice Residency programs were in two states, Pennsylvania and New Jersey. This brought some logistical challenges to the study. Working with both residency directors closely was key to ensuring coordination of resources, schedules, meetings and open lines of communication during the study. This researcher functioned as an internal leadership consultant to the Family Practice Residency faculty and two chief residents in the program. To maintain a presence throughout this study this researcher clearly articulated his role in the study from its' inception to completion. The researcher recused himself from any situation which threatened the integrity of this study.

## Significance

The works of Wheatley (1999) and Shields (2010) identify the core values of equity and social justice. The genuine expression of these core values requires the ability to see the needs of others as a higher cause to pursue. Healthcare leaders have an inherent desire to improve the quality of life for others. In the case of this study, the works of Wheatley (1999) and Shields (2010) can be applied. The pursuit of equity and social justice expands the purpose of this study as it affords improvement in the life of residents and ultimately the patients who they serve. Shields (2010) described a perspective taken by the purpose of a transformative leader is “changing something” (p. 564). In healthcare, the challenges to transformative leadership are evident in academic medicine where content is customarily presented in didactic lecture format (Armstrong, 2007).

Driven by the inability of medical schools to change the time honored sense of traditional values of extoling singular achievement, leadership in medicine has not kept pace with the current collaborative healthcare delivery models. Jost (2012) described this phenomenon in a theory called system justification. The essential idea of this theory is that people are motivated to “rationalize the status quo as legitimate” even if it is contrary to their interests (Jost, 2012 p. 194). Academic medicine is not accustomed to speed and efficiency in the delivery of healthcare. Transformative leadership in this academic setting requires individuals with vision, who desire to mentor, work collaboratively and lead by the use of moral authority (Armstrong, 2000). Physicians often express resistance when it threatens their position of privilege. As a transformative leader the researcher recognized that differences in systems are unavoidable.

Learning transformative leadership skills and accepting the responsibility of approaching issues affords access into changing these systemic issues. Using a transformative voice affirmed

the researchers' pursuit of active social justice behavior. This is the changing behavior proclaimed in the works of Shields (2010) and Wheatley (1999). The study of exploring the integrative relationship between emotional intelligence and metacognition by a resident when thinking about a patient in a clinical setting, strongly asserts a transformative changing approach in medical residency education. The intention of improving a facet of medical education for residents addresses an even bigger issue identified as improving the quality of patient care. A continued transformative strategy applied in medical residency education could use integrative methods in other areas of clinical education which have demonstrated reluctance in pursuing a perspective of changing how a system or process is viewed.

## **Conclusion**

This writing began with the importance of understanding the relevance of interpersonal skills in medical education. Key concepts of this study, emotional intelligence and metacognition, were introduced along with research illuminating previous applications of these concepts in medical education. The conceptual framework articulated the emergence of a unique study moving away from prior research. This positions the concepts of emotional intelligence and metacognition from being independent of each other to an integrated approach utilizing reflective practice. Chapter 2 identifies how the concepts of emotional intelligence and metacognition have been previously applied in medical education. Chapter 3 offers a transformative journey into the methods of a new research study. Chapter 4 identifies the results of the integrated study. Chapter 5 interprets the study findings and offers recommendations for further studies.

## **CHAPTER 2**

### **LITERATURE REVIEW**

The study of emotional intelligence, metacognition and the application of these concepts in medical residency education linked to the clinical care of a patient began twenty years ago. This review examined the existing literature in residency medical education relative to emotional intelligence and metacognition and their influence on the care of patients. The review reflects a non-integrative path of research conducted in each of these concepts over this period of time. A non-integrative approach is defined as research which examined the influence of each concept independently in residency medical education.

The concept of emotional intelligence is succinctly described as how an individual manages his/her emotions and the emotions of others (Mayer and Salovey, 1997). A literature review of emotional intelligence will demonstrate the importance of emotional intelligence related to the clinical care of the patient, interpersonal skills, professionalism and medical knowledge (Arora et al., 2010). Increased calls for research in emotional intelligence have been affirmed in medical training (Arora et al., 2010; Grewal & Davidson, 2008; Pilkington, Hart & Bundy, 2012). Lucy, Souba & Taylor (2010) have called for a new model for teaching professionalism to those in medicine. They framed this call as a need for “structured reflection” which aligns to emotional intelligence and being self aware. Eubank, Gefken, Orzano, & Ricci (2012 p. 241) identified the relevance of emotional intelligence during residency training. Since 1979 acknowledgement of the word metacognition and its function in both animals and humans has been studied by academics, psychologists, psychiatrists, educators, nurses, philosophers, and neuroscientist. There is no singular definition of metacognition however, there is a generally

recognized explanation of the word in the literature. Flavell (1979) first described metacognition as our ability to understand our thinking about thinking. The application of metacognition in medical residency promotes the development of thinking more flexibly and becoming more agile learners (Eichbaum, 2014) subsequently training residents to become less reliant on memorization. The development of metacognitive skills in medical residency prepares the medical resident to respond with more agility to the complexities of medical care (Eichbaum, 2014). The concepts of metacognition and emotional intelligence initially received attention in the business world.

Within the world of healthcare these concepts have been reviewed separately and only in the past twenty years. This does not imply the world of medicine is disinterested. Metacognition, when reviewed in health care literature, is referenced in clinical teaching settings where talking things out are affirmed metacognitive skills exhibited by the student (Lajoie, 2008). While each of these concepts afforded independent reviews in the medical literature there is an inherent problem in reviewing these concepts separately. Educating a medical resident requires understanding the thoughts guiding the physician's clinical perceptions, the physician's ability to ask questions, his/her knowledge to pursue diagnostic data and potentially codify diagnosis as well as the ability to establish rapport with the patient are integrated skills and need to be examined as such. This research topic examined the relationship between emotional intelligence and metacognition and their influence on reflective practice. This is a unique research topic. The uniqueness of this study provided additional research and knowledge to the existing literature.

This literature review identifies the application of emotional intelligence and metacognition in medicine. The review defines emotional intelligence and pursues its'



application in medicine however, the review only identified the concept of emotional intelligence in the literature as an independent concept not examined with the concept of metacognition. It provides a rationale for educating physicians in emotional intelligence and delineates emotional intelligence in medical students from emotional intelligence in residents. It explores gender differences in emotional intelligence between male & female residents as well as emotional intelligence in sub-specialty residents. It concludes with the various methods used in assessing emotional intelligence.

Each of these areas examined in the literature review have a common theme of being examined independently without the concept of metacognition. A description of metacognition is reviewed followed by the description of each element in metacognitive thinking i.e. metacognitive component-knowledge of task, metacognitive knowledge of strategy and metacognitive regulation. Research of metacognition in medicine is reviewed. Metacognitive skills in residents and students are examined. The assessment of metacognition and the instruments used are reviewed. In each of these applications of metacognition in medical education the literature review did not identify one study where the application of emotional intelligence was examined with metacognition.

The review identified research in medical residency education in the concepts of emotional intelligence and metacognition. The findings from this review demonstrate a research approach which identified a non-integrated approach to the concepts of emotional intelligence and metacognition in medical residency education. As a transformative leader it is important to study these two concepts from an integrative perspective with the intention of improving a facet of medical education for residents.

Understanding the methods used in this literature review is important. Snowballing was incorporated as a research methodology. The research sources included: Pub Med, Ebsco, ProQuest Health Management, JSTOR, Eric and Bio Med Central. The search included peer reviewed articles and books published by authors from academic research centers. The research parameters included only articles or books published within the past ten years.

The literature review typology formulated from the works of Callahan (2014) Torraco (2005) and Kennedy (2007) and described as integrative works best in the topic study. This is demonstrated in the review by exploring both topics emotional intelligence and metacognitions as competencies in medical residency education. The work of Kennedy (2007) described the integrative literature review taking a perspective which is broad in its approach to scholarly literature. Reviewing the concepts using the approach described by Kennedy (2007) the review explored varying perspectives in support of this broad perspective. Kennedy (2007) postulated this view can be both empirical and non-empirical, theoretical and conceptual. The perspectives of Kennedy can be applied, historically, to the research in metacognition and emotional intelligence that appeared in the literature review.

Interest in this topic resides in the integration of emotional intelligence and metacognition. Individually, the concept of metacognition has existed in the general literature for over 38 years. However, the application of these concepts, individually, in a clinical setting is an emerging topic in the field of medicine that has slowly evolved only over the last decade. The work of Falcone et al. (2014) in metacognitive analysis speaks to the current research correlating strong metacognitive skills of senior level surgical residents demonstrated by their ability in having difficult conversations with patients. The work of Weng et al. (2011) in a study

with surgeons identified positive correlations between emotional intelligence, empathy and patient satisfaction which underscores only recent interest in this topic within medical education.

Published research on the integration of these concepts has not appeared in the literature to date. It is this area of integrative typology which affords this researcher an opportunity to create a new perspective on this topic. Application of the integrative review typology, in particular, the synthesis of the literature, identified a convincing argument to pursue the need for additional research into the influence of emotional intelligence and metacognition in clinical medical education.

### **Emotional Intelligence**

The theory of emotional intelligence has an evolutionary history. The concept was first introduced by Mayer and Salovey (1990 as cited in Arora et al., 2010). A definition of *emotional intelligence* is “the ability to monitor one’s own and other’s feeling and emotions, to discriminate among them and to use this information to guide one’s thinking and actions.” (Mayer & Salovey, 1997, p. 3). Essentially, this description of emotional intelligence describes how an individual manages his/her own emotions and the emotions of others. As a theory, emotional intelligence has become vastly popular first in the world of business and most recently, within the past 20 years, in healthcare. The in-vogue use of the term emotional intelligence achieved, in part, because of this widespread use of the term in business and within the jargon of pop culture--has not generated advancement of the theory. The theory has essentially languished in its development. The bifurcation on one agreed definition of emotional intelligence has contributed to this problem. Gayathri and Meenakshi (2013) analyzed a number of emotional intelligence models (Goleman, 1995; Bar-On, 2002; Mayer & Salovey, 1997) which exemplified the divergence of thinking used in conceptualizing emotional intelligence. This divergence in theory

and absence of strong research creates an opportunity for empirical research. Without continued research the theory of emotional intelligence will not achieve the distinction afforded under academic standards. Gayathri and Meenakshi (2013) believed the concept of emotional intelligence needs to be researched more thoroughly in order to repel the challenges to its efficacy as a concept. The authors addressed the need for simplified definitions and approaches used to correctly evaluate the emotional skill set of a person.

### **Emotional Intelligence in Medicine**

The increasing need to continue research into the application of emotional intelligence is expressed in the work of medical training. Current practice and research illuminates this research. A physicians' ability to understand and manage emotions is a fundamental skill in the practice of medicine. Medical education aspires to develop physicians who have a wide scope of clinical skills which include the ability to be emotionally responsive (Arora et al., 2010). There has been a sustained effort to define and assess the the essential elements of a competent physician.

In light of this work, the Accreditation Council for Graduate Medical Education (ACGME) developed six core skills required in graduate medical education. These include Patient Care, Medical Knowledge, Professionalism, Systems based Practice, Interpersonal and Communication Skills. A literature review of emotional intelligence in a clinical setting indicated application of emotional intelligence to Interpersonal Skills and Communication, Patient Care, Professionalism, Medical Knowledge and Practiced-based Learning and Improvement (Arora et al., 2010). There is growing evidence of emotional intelligence being incorporated into the development of physician training (Grewal & Davidson, 2008; Pilkington, Hart, & Bundy, 2012; Arora et al., 2010). The work of Arora et al. (2010) holds extreme

significance in the continuing work of aligning the ACGME core competency requirements to physician training for these reasons: Their research indicated significant gains in emotional intelligence behavior evident in increased positive relationships in diagnostic and doctor patient communication when emotional intelligence training was offered. The authors' comprehensive review of emotional intelligence assessment of these core competencies applied to eleven studies yielded significant findings. Of note, six of seven studies indicated women to have higher emotional intelligence than men. Doctor- patient relationships improved in three studies where emotional intelligence was higher. The study by Arora et al. (2010) was reportedly the first published work which linked emotional intelligence training to ACGME competencies.

A physician's understanding of his/her own emotions and how they are managed in the care of patients impacts the interpersonal communication between the patient, their family, other care givers i.e. nurses, aids, and other allied health professionals. Hinkle et al. (2010) identified the increasing interest by physicians in emotional intelligence as it relates to medical malpractice claims by patients. This research identified additional interest, motivated by potential monetary loss, in the perceived relationship between physicians and their patients through a lens of emotional intelligence. Integration of emotional intelligence and its' contribution to the ACGME competency of interpersonal and communication skills needs continued research (Grewal, Davidson, 2008). The theory of emotional intelligence "could help define the intricate skills required in medical residents achieving the interpersonal and communication skills competency" (Grewal, Davidson, 2008). However, few controlled studies have been able to successfully test the efficacy of emotional intelligence training programs and even fewer have used a measure that was ability based. Some have "simply used self-reporting as a measure"

(Grewal, Davidson, 2008). Continuing research is required in health care to determine “if emotional intelligence matters and how it can be applied to patient care” (Arora, et al., 2010).

The focus of this subheading identified the application of emotional intelligence in graduate medical education. It is important to note graduate medical education applies to interns and residents who are referred to as physicians completing residency or training in their specific interest in medicine. Attention is paid to this population of physicians early in this literature review because of the preponderance of emotional intelligence content related to graduate medical education and residents.

### **Rationale for Educating Physicians in Emotional Intelligence**

Application of emotional intelligence to physicians who have been licensed in their area of practice offers a different perspective on the application of emotional intelligence. This group differed from the prior group that focused attention on those still in training. Pilkington, Hart & Bundy (2012) argued that the specialty of obstetrics and gynecology required extraordinary emotional intelligence skills. They suggested the physician in this specialty area needs to exhibit skills of empathy and social responsibility. Additionally, they cited a need to professionally respond to individuals who are facing decisions related to the baby during childbirth. Their research findings indicated educational curriculum in obstetrics and gynecology training already contains emotional intelligence training presented explicitly or implicitly. These results validated their perceptions that their area of specialty practice required higher skills in emotional intelligence.

Weng et al, (2011) identified older surgeons with higher emotional intelligence scores were more likely to have a positive relationship with patients. Surgeons with better patient relationships appeared to have more satisfied patients. This study indicated the effect of the

surgeon's emotional intelligence only influenced their positive relationship to the patient before surgery. This study suggested a need for continuing research into the dynamics of physician-patient relationships and specifically the need to understand empathy and relationships where emotional intelligence is practiced (Weng, 2011). This research noted a relationship between emotional intelligence and physician rapport with patients. Weng et al., (2011) suggested healthcare organizations might consider existing promotion criteria and begin to offer continuing medical education promoting patient satisfaction. An exploration into physician competencies is one strategy of building in emotional intelligence education into physician education.

The literature identified the selection process of physicians for employment as an area of application of emotional intelligence and its consequence. A physician acts as a leader in a healthcare organization therefore an individual who lacks emotional intelligence may potentially present behavioral or attitudinal issues impacting the environment of care (Morales, 2014). Assessing for emotional intelligence in physicians who are licensed and practicing presents continued research opportunities.

### **Emotional Intelligence in Medical Students**

Unlike practicing physicians, the world of a medical student offers other challenges. Students experience the demands of coursework, dealing with patients for the first time, living away from home and learning to manage financially, socially, and emotionally all present potential levels of stress (Birks, McKendree & Watt, 2009). Emotional intelligence and stress levels in medical students were examined in the practice of a surgical technique performed in a simulation lab. Arora et al. (2011) identified the importance of discovering those who were most likely to experience stress. This led to an educational program and skill development to increase coping skills in the surgical setting for the students. Those students who achieved higher

emotional intelligence scores were found to experience higher stress during “unfamiliar surgical scenarios” but were also more likely to be able to respond better after the surgical task was completed, described as after task recovery, as opposed to peers with lower emotional intelligence. The performance of first year medical students on exams was examined from a perspective of empathy and emotional intelligence (Austin, Evans, Goldwater, Potter, 2005). Findings from this study indicated students who scored high in empathy were found to be positively associated with emotional intelligence and their ability to talk to families (Austin et al., 2005). Studies like these continue to acknowledge the value of emotional intelligence research.

Where there is a lack of emotional intelligence an early educational intervention can be designed. If there are strong emotional intelligence skills evident in the practice of a potential care provider they too can be supported, particularly in the early years of medical school education. Cherry, Fletcher and O’ Sullivan (2014) applied the term *ability based emotional intelligence* which recognized, that emotional intelligence has the capacity to increase with age. These findings continued to raise the prospects of replicative studies or further questions about the influence of age and maturity on the emotional intelligence of medical students. “What is particularly important for future research to determine is the extent to which the effects of emotional intelligence and stress have a bearing on actual clinical performance” (Arora et al. 2011. p.1316).

### **Emotional Intelligence in Residents**

There is increasing interest in the study of emotional intelligence with physicians who have entered into their residency years. As previously mentioned, this is largely due to the ACGME competency requirements. This raised a question for all residency directors Can



emotional intelligence be used as a predictor of success in acquiring the ACGME competencies? McKinley et al. (2015) examined the emotional intelligence of residents participating in three specialty areas of practice and concluded scores were comparative with the general population. The authors suggested the use of a targeted emotional intelligence training depending upon the needs of the particular specialty. Further research is also suggested to determine if emotional intelligence is a predictor in the performance of clinical skills in residents (McKinley et al., 2015). Residency programs around the country expend considerable resources in the selection process of candidates. Talarico et al. (2011) conducted research that utilized an emotional intelligence assessment applied to anesthesia candidates. Their findings indicated considerable strength in the emotional assessment inventory as an indicator of clinical performance in an anesthesia resident. There is an increasing interest in using emotional intelligence as a predictor of future clinical success. Reed et al. (2015) provides an example using pediatric interns.

Emotional intelligence applied to the ability of residents to communicate mortality news to families has received almost negligible attention in the literature. A study was conducted with first year pediatric residents to determine if emotional intelligence improved this area of clinical communication. Reed et al. (2015) found first year residents scored well in emotional intelligence but poorly in delivering mortality news. These scores suggested higher emotional intelligence scores is not sufficient enough to deliver mortality messages. These findings continued to inform the research literature of the limitations low emotional intelligence has on some areas of clinical practice. Some residency programs have included the task of growing leadership skills within the time of residency to prepare future physician leaders as developers of teams. (Chan, et al., 2013; Johnson & Stern, 2013; Saxena et al., (2014). Jensen et al. (2008) conducted a descriptive study using surgical residents to assess emotional intelligence using a 20

item leadership assessment. This study indicated surgical residents scored, as a group, high in emotional intelligence and agreement in their belief that strong team leadership and communication skills were important (Jensen et al., 2008).

### **Emotional Intelligence and Gender Differences in Residents**

The literature review thus far has focused on the specific populations in medicine. This review also examined the influence of gender and emotional intelligence in residents. Does it make a difference in terms of overall emotional intelligence scores? The measure of emotional intelligence as it relates to gender scores has been reviewed in the field of medicine. McKinley et al. (2014) identified global emotional intelligence scores between men and women are not significantly different. McKinley et al. (2014) conducted research using a population of females in three types of residency programs, pathology, pediatrics and general surgery. Findings from this study indicated men and women in all three specialties scored near-identical global emotional intelligence scores. The results demonstrated no significant gender difference suggesting the specialty attracts individuals who have a certain emotional intelligence make up. The paucity of research combining gender, medical education and emotional intelligence identified an opportunity to incorporate this as part of the study by this researcher.

### **Emotional Intelligence in Sub-Specialty Residents**

Jensen et al. (2008) conducted a descriptive study using surgical residents to assess emotional intelligence using a 20 item leadership assessment. Findings from this study indicated the residents believed in the importance of leadership skills and scored high in emotional intelligence. The study affirmed emotional intelligence within the sub-specialty of surgery is a recognized asset to surgical residents. Residents who participated in the study agreed that communication skills and strong leadership are important to surgeons. “Emotional intelligence

is a tool that can be used for team leadership and communication training” (Jensen, et al., 2008.p 7). Jensen et al. (2008) indicated the need to conduct more research within other residency programs. The researcher continues to examine the literature for other replicative studies utilizing the 20 item leadership assessment sub-specialty residents however, none have been identified. This affirmed the need for research in other residency programs.

### **The Call for Future Research of Emotional Intelligence in Medical Residency Training**

Analysis of the methodology used to assess emotional intelligence varies and is dependent upon the population being studied, size of the population, age, demographic and the assessment measurement being applied to the particular study. Some authors of emotional intelligence studies have reached their conclusion section with a request for a consistency in the process of assessing emotional intelligence (Freshman & Rubino, 2004). Freshman & Rubino (2004) identified a continued need for empirical research in the use of emotional intelligence skills in healthcare using both qualitative and quantitative research methods. Taylor, Farver & Stoller (2011, p.1554) stated “our hope is that colleagues who develop policies regarding professionalism and who train physicians will consider learning more about emotional intelligence and incorporate emotional intelligence training into curricula for professionalism”. Lin, Liebert, Tran, Lau, Salles (2016, p. 357) stated “the relationship between physician emotional intelligence and clinical performance and patient outcomes should be more fully explored”. Grewal & Davidson (2008, p.1202) stated “clearly the concept of emotional intelligence needs further development in medical training”.

Future research should focus on validated measures of emotional intelligence using larger samples sizes which evaluate associations between clinical outcomes and emotional intelligence (Chan, Petrisor & Bhandari, 2013). It is does not appear likely in the near future there will be

movement toward one consolidating methodology. My research answers the call for a new research method and assessment tool entering the market. If disruptive design created an alternative to the variations of statistical analysis currently being deployed it could potentially promote additional research thus developing a respected theory of emotional intelligence.

### **Metacognition**

The term *metacognition* was first developed by Flavell in 1979 (cited in Veenman et al., 2006) and since that time there has been a proliferation of information about the concept. There are varying definitions of the term metacognition. Eichbaum (2014) described metacognition as “thinking about thinking”(p.4). This definition frames the process making it easier to comprehend. Constructively critical arguments have been made about the concept of metacognition because of the umbrella of terms associated with the concept (Veenman et al., 2006). There is agreement in the literature regarding the need for a unifying definition of metacognition and the components surrounding the concept. A continued clarification of metacognition, providing clear definitions (because none have been standardized) remains an important issue which needs resolution (Schunk, 2008).

The application of metacognition has been seen in academic learning research where exploration of an individual’s thinking and feeling state are being explored from the perspective of understanding a teacher’s effectiveness in the classroom (Lajoie, 2008). Assessing the content and teaching methods of medical instructors can help determine the most effective models for instruction which ultimately lead to increasingly effective practice (Lajoie, 2008). The application of metacognition to medical education has received increasing attention because of the rapid growth in medical knowledge (Eichbaum, 2014. p.2). Curriculum specialists in medical schools have begun to promote the use of metacognition to foster learning which enables

a deeper comprehension of the content over time while affording the learner the opportunity to think out loud in the clinical setting (Eichbaum, 2014). The development of educational strategies in medical schools utilizing metacognition is described in the remaining sections.

### **Knowledge of Task**

There are subtle yet distinct difference between metacognitive knowledge and skills. Veenman et al. (2006) described metacognitive knowledge being what the person describes they know about a person, task or strategy. Metacognitive skills describes the procedures a person completes while problem solving. Veenam et al. (2006) stated a person's metacognitive knowledge about his/her learning process can be correct or incorrect. If our learning is incorrect we may be resistant to changing our thinking. With regard to metacognitive skills the feedback is immediate, people are able to plan tasks and take action smoothly or actions are not completed well. Subsequently, if the latter occurs the individual requires new knowledge but skills take time to develop. Research into this area of metacognitive functioning requires more taxonomies of knowledge and skills (Veenam et al. 2006). Dunphy et al. (2010) described the cognitive factors that influence the learning process and the quality of care given to the patient. This interest moves metacognition as a concept into clinical application.

### **Knowledge of Strategy**

Eichbaum (2014) introduced a metacognitive learning model to students in a medical school setting. His concept evolved to developing metacognitive skills by introducing humanities into the medical school curriculum. His strategy proposed the development of flexible thinkers and agile learners. These were also seen as antecedents to navigate a medical world filled with ambiguity and uncertainty. Learning outcomes from this strategy have continued to be reviewed. Epstein, Siegel, Silberman (2008) indicated metacognitive self-

monitoring affords the individual the opportunity to synthesize data and through reflection consider improving personal performance. Early results indicated the development of these skills may need to be introduced at a latter point in the educational process.

### **Metacognitive Regulation**

The literature in the area of understanding the components of metacognition and their development is limited. Speculation about the development of metacognitive knowledge and skills in the early preschool or early school years is posited by (Veenam et al. 2006). Efkleides (2009) identified the concept of metacognition occurring in the process of thinking. Further research needs to include an understanding of the time in which metacognitive process begins and under what circumstances. Intellectual ability gives students a head start in metacognition but it does not affect the developmental course of metacognition (Veenam et al., 2006). Knowing about these contributing components guided continued understanding into application in educational settings. Monitoring in metacognition may involve metacognitive awareness of the amount of effort invested, time used and change in task conditions (Duffy et al., 2015). This author spoke to the keen awareness needed to have insight into metacognitive functioning at the conscious level. The expression of insight during these life situations reinforces this skill.

### **Metacognition in Medicine**

Dunphy et al. (2010) identified a growing emergence of metacognitive theory in medical education literature as a potential model for understanding the clinical reasoning process. Additionally, medical student performance on an objective structured clinical examination (OSCE) afforded an opportunity to apply the concept of metacognition to test taking anxiety (Brannick, 2013). Falcone et al. (2014) described medicine as shifting to an outcomes based model for assessing residents and fellows in assessing their skills through the ACGME core

competencies. These aforementioned studies identified a growing interest in the application of metacognitive concepts in medicine. The implicit understanding of this growing work between theorists in metacognition and medicine is a need to develop interpersonal skills in the training of future physicians. There is a growing interest in metacognition however, not a broad application of research. It appears the portal into metacognitive studies in medicine will be through medical school education, residency and fellowship programs. Citing prior evidence and knowledge of the ACGME requirements (Webb, Young, Baumer, 2010) for core competencies in clinical training, communication with patients seems a likely competency to focus a metacognitive study.

### **Metacognition Skills in Residents and Medical Students**

Falcone et al. (2014) applied a metacognitive assessment to a study of surgical residents because of the recognized paucity of metacognitive skill assessments as they relate to communication skills in surgery residents. This study illuminated the value of identifying the metacognitive skills and insights in clinical practice. They stopped short of a stronger influence, post study, by not placing metacognition training into their existing surgical residency curriculum. Duffy et al. (2015) conducted a study in the assessment of metacognitive skills utilizing medical residents. The outcomes of this study indicated team members needed to be better equipped in metacognitive skills when directing a team in a crisis event. The study identified the underutilization of individuals who may have added skills in monitoring emotions during the event. This study also identified a deficit or disconnect in the ability to utilize metacognitive skill sets in a training event. Cumulatively, these studies produced results that identified the need to explore the application of metacognition in clinical settings.

## **Metacognition and Communication**

Recognizing a need to address the clinical competencies prescribed by the Accreditation Council for Graduate Medical Education (ACGME) all graduate medical education programs are tasked to improve skills in all six areas of competencies. Falcone et al. (2014) identified the adaptation of metacognitive skill development to improve communication skills between surgery residents and patients in a surgical residency program. Duffy et al., (2015) drew a similar comparison in the desire to identify a need for increasing communication with medical residents in a simulated learning lab where communication skills are essential. This study acknowledged the need to further explore the understanding of metacognition and its association to physician communication in a clinical setting.

Research into the application of metacognition in clinical settings, graduate medical education programs and medical education is sparse and requires increasing involvement from those who lead medical education programs. Kennedy et al. (2014) drew upon a peripheral reference in likening the metacognition of a soccer player as being in the zone or in the flow of knowing how to proceed with a process without a cognitive explanation. The absence of research to understand how metacognition affects physician communication represents a gap in knowledge and identifies another focus of this proposed research.

## **Assessing Metacognition**

Measurement of metacognition is naturally difficult because the behavior is not explicit. (Veenman, 2006). Shunk (2008) discovered the major gaps is assessing metacognition by describing the lack of clear definitions for metacognition, self – regulation and self –regulated learning. His directive and necessary call instructs researchers to choose other perspective to influence metacognitive theory (Shunk, 2008). The tools most commonly used are



questionnaires and interviews. The study of metacognition if not linked solidly to theory and runs the risk of being dismissed by those who create educational policy and practice in medical education. Continued review of metacognitive assessments is warranted and a priority in this research topic in order to link research results to theory.

### **Conceptual Framework**

The concepts of emotional intelligence and metacognition define the framework for this study. Identifying these two concepts and their application in medical residency training has illuminated the need for continued research. Increased calls for research in emotional intelligence have been affirmed in medical training (Arora et al., 2010; Grewal & Davidson, 2008; Pilkington, Hart & Bundy, 2012). Freshman & Rubino (2004) identified a continued need for empirical research in the use of emotional intelligence skills in healthcare using both qualitative and quantitative research methods.

Metacognition, when viewed in the healthcare literature, is referenced in clinical teaching settings where talking things out are affirmed metacognitive skills exhibited by the student (Lajoie, 2008). Additional support for the continued study of metacognition in medical education aligned to ACGME competencies has been noted. Citing prior evidence and knowledge of the ACGME requirements (Webb, Young, Baumer, 2010) as a core competency in clinical training, communication with patients seems a likely competency to focus a metacognitive study.

It is this area of integrative typology that affords an opportunity to develop a new study. The research methodology proposed the study of a relationship between emotional intelligence and metacognition and their influence on reflective practice in medical training. It incorporated

both qualitative and quantitative methods. Studies utilizing both methods have not previously been conducted.

### **Summary**

This chapter examined the concepts of emotional intelligence and metacognition through a literature review from a broad historical perspective to the application of these concepts in medical residency education. The efficacy of this proposed prospective study is supported by the lack of research found in existing literature that examined the relationship between emotional intelligence and metacognition in medical residency education. Additionally, the influence of these two concepts on reflective practice in medical education in residency education has not been examined. Chapter 3 will explore the methodology used in this study.

## **CHAPTER 3**

### **METHODOLOGY**

This quantitative research study was designed to identify the integrated concepts of emotional intelligence and metacognition and their influence on reflective practice in medical residency training. Freshman & Rubino (2004) identified a continued need for empirical research in the use of emotional intelligence skills in healthcare using both qualitative and quantitative research methods. The literature review noted metacognition applied to clinical decision making in medical education has been inadequately researched to date (Iannello, 2015). Hilton & Slotnick (2005) identified the need for physicians to acquire the essential clinical skills needed to practice professionally. Additionally, they defined the term “sophisticated reflection” (Hilton & Slotnick, 2005 p. 59) as the application of an insightful process by the physician affording him/her a greater understanding of the patients’ needs. Responding to the need for increased research into the concepts of emotional intelligence and metacognition in medical residency training, this study will apply a new research approach. A quantitative methods approach, previously not adapted to an integrative study of these concepts in medical residency education, will be applied to understand the influence of these concepts on reflective practice in medical residency. The quantitative methodology assessments, data collection, research method and design, setting, participants and data analysis are described in this chapter.

### **Research Method and Design**

The study of emotional intelligence and metacognition has previously been examined in medical residency training literature as independent concepts (Hinkle et al., 2010; Grenwal & Davidson, 2008; Pilkington, Hart & Bundy, 2012; Weng et al., 2011; Austin, Evans, Goldwater, Potter, 2005). In this prospective study these concepts were examined as integrated concepts.

Examination of the concepts and their influence on reflective practice in medical education training represents a new and emerging topic. I proposed a quantitative study. “Quantitative research creates meaning through objectivity uncovered in the collective data” (Williams, 2007, p.66). The application of quantitative methods were used in studies to determine relationships by the use of objective measurements through statistical analysis (Babble, 2010). Quantitative research gathers data and places the data in a statistical analysis to explain what is observed (Babble, 2010). Quantitative methods were used in the study to gather numerical data and determine if a relationship between emotional intelligence and metacognition exists in family practice residents. The research study questions and hypothesis for this proposed study were designed to examine relationships between emotional intelligence and metacognition not to predict outcomes (Creswell, 2014).

### **Research Questions and Hypothesis**

Research questions were used in quantitative research to collect data to use in numerical form (Creswell, 2014). The following research questions and hypothesis guided this study. These three questions are: When the concepts of emotional intelligence and metacognition are evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident? What influence did age, sex and residency year have on

the emotional intelligence and metacognitive ability of the resident? What influence did metacognition and emotional intelligence have on the reflective practice of the resident?

Creswell (2014) suggested that researchers using a null and alternative hypotheses to make predictions about a study's outcome. The null hypotheses reflected no observed effect from the study. The null hypotheses in this study indicated, by finding, no relationship between emotional intelligence and metacognition. The alternative hypotheses would have reflected an observed effect from the study. The alternative hypotheses in this study was: a relationship between emotional intelligence and metacognition is found.

### **Instruments**

The quantitative methodology included the application of the Mayer-Salovey & Caruso Emotional Intelligence Test (MSCEIT) a validated and reliable 141 item assessment of emotional intelligence (Mayer, Salovey & Caruso, 2004). "The MSCEIT is, indeed, a convenient-to administer test that is highly reliable at the total score area" (Mayer, Salovey, Caruso, 2004, p.211). This assessment utilized to assess the emotional intelligence of each family practice resident participating in the study. Prior to completing the MSCEIT participants were asked to enter demographic information including: participant number, age, gender and year of their residency (family practice residency extends three years).

The metacognitive awareness of each family practice resident was assessed by the application of the quantitative Metacognitive Awareness Inventory (MAI) developed by Schraw & Dennison (1994). "Findings indicates that the MAI provides a reliable initial test of cognitive awareness" (Schraw & Dennison, 1994, p.472). This 52 item, paper and pencil assessment is a valid and reliable assessment utilized to assess the knowledge and regulation of cognition in each family practice resident participating in the study.

The reflective practice of each family practice resident was assessed by the application of the Groningen Reflection Ability Scale (GRAS) developed by Aukes, Geertsma, Schotanus, Zwierstra & Slaets, (2007). This is a 23 item paper and pencil assessment. It was used to assess the reflective ability of the family practice resident participating in the study. The assessment is valid and reliable.

### **Validity and Reliability**

Validity in a quantitative study was defined as the extent to which a concept is accurately measured (Heale, Twycross, 2015). There are three types of validity defined as content, construct and criterion based. Reliability in a quantitative study is defined by the consistency of the measure over time (Heale, Twycross, 2015). Attributes of reliability include: homogeneity, stability and equivalence. Brackett & Mayer (2003) reported test-retest reliability of the full test MSCEIT as .86 a strong indication of this assessments reliability. “A number of studies have shown the test has discriminant, convergent, predictive and incremental validity” (Brackett, Salovey, 2006 p.35).

Schraw and Dennison (1994, p. 464) identified the reliability coefficient of the Metacognitive Assessment Inventory (MAI) as .95 indicative of a high degree of internal consistency. Validity of the MAI reached a level of .75 indicative of a high degree of validity (Sperling et al., 2004). The use of these assessments as” statistically reliable and valid assessment instruments, cited by other authors & accepted scales of measurement” (Creswell, 2014, p.157) is found in the work of Mc Call (1970, p.108-314).

Aukes et al. (2007) identified the Cronbach’s alpha score of .83 indicative of a high degree of reliability. Content validity of the GRAS reached a level of .78 is satisfactory (Aukes et al., 2007). These assessments met the selection criteria identified by (Creswell, 2014, p.157)

as “accepted scales of measurement, information about reliability and validity of scores from past uses of the instrument”.

### **Study Setting and Participants**

A quantitative research study selects participants by probability sampling. Probability sampling intends to identify a representative sample where data is collected (Blackstone, 2012).

#### **Setting**

This proposed study was conducted in a health network located in Pennsylvania and New Jersey. These site locations provide access to a family practice medical residency program where medical education training is conducted. Utilization of a medical residency program to conduct this study is consistent with previous research of emotional intelligence and metacognition with medical residents and is noted in the literature (Mc Kinley et al., 2014; Chan, Petrisor & Bhandari, 2013). This study was reviewed and approved on 12/02/16 by the internal review board at St. Luke’s University Health Network.

Permission to work with the family practice medical residency programs was granted by both physician program directors in Pennsylvania and New Jersey. To ensure the program directors do not influence this study by requiring resident’s mandatory participation, I met with each program director prior to the study and affirm the importance of removing any potential influence by their position. The discussion with each program director included the importance of not influencing participation either by written or verbal communication with any resident before or during the study. I drew upon three core values of the organization: respect, accountability and caring in this conversation with the program directors to strongly emphasize the importance of these ethical boundaries. The researcher did not report to the program

directors. The researcher is not a faculty member of the family practice residency program. The researcher provided leadership coaching and development to the chief residents. These are defined as residents who have reached their third year of residency training. Family Practice residency training is three years in duration. Residents from each year were invited to participate in this study. This study was conducted using the same administration format at both residency sites. Individual participants were assigned by the researcher an identifying number used on all assessments for this study in order to sort the data by age, gender and year in the residency program and to avoid potential confidentiality issues from occurring. All participants received, prior the start of this study, a letter from this researcher clearly articulating the intention of maintaining the highest ethical research standards including maintaining confidentiality when reporting any data yielded from this study.

A letter including any unintended consequences was developed by this researcher. Residents in the study received their results in an individual meeting with this researcher. The researcher developed a written summary of results for each participating resident and scheduled time to discuss these results with the resident at the conclusion of the study. Both residency programs have a regularly scheduled education day built into each clinical work week. Residents meet as a group in education day. This group format provided the researcher the opportunity to administer the quantitative assessments in the group format with other family practice residents. This was explained to each resident two weeks prior to the administration of the assessments. The total time estimated to complete both assessments was 60 minutes. The geographic distance between each of the family practice residency programs is 10 miles.



## **Participation/ Sample**

All 36 family practice medical residents in the health network were invited to voluntarily participate in this study. This residency group was selected because it offered a larger sample size than other residency programs in the health network. Family practice medical residents were identified in the literature as participants in previous emotional intelligence and metacognitive studies (Mc Kinley et al., 2014; Talarico et al., 2012; Falcone et al., 2014).

## **Study Conduct**

To ensure the information of residents participating in the study remains confidential the researcher assigned a unique number to each participating resident. Names were not used to identify the participants and only the researcher had knowledge of the number assigned to the participating resident. This was clearly articulated to each resident in the meeting two weeks prior to the assessments being given. All information was retained by the researcher only. This information was not be shared with other residents, program directors or any other member of the health network.

## **Informed Consent**

Individual resident interviews were designed to occur in a private office setting on the same site of each residency program. The researcher met with each resident and provided a succinct description of the research study. This conversation covered the following information: they were under no obligation to participate, they were free to withdraw from the study at any time without prejudice to pre-existing entitlements, they were given, in a timely manner, throughout the course of the research project, information relevant to their decision to withdraw or continue participation, They were given, in written form, their rights to request withdrawal of data, including any limitations of the feasibility of that withdrawal. Each of these points were

articulated in a document given to each resident requiring their signature. This served as the residents' agreement to participate or decline participation in the study. Following this conversation, the resident had one week to decide to participate or decline participation in the research study by forwarding their signed agreement to participate or not participate document to this researcher in a sealed inter-office enveloped addressed to this researcher and stamped "confidential". To retain the highest level of confidentiality during this study all paper and pencil survey instruments given to each participant werer assigned an identification number. This number and its' significance was only be known to the researcher. Administration of the MSCIT, which is an online assessment, was designed to require the assigned identification number at the time of login. The only identification information on the MSCEIT was an assigned number.

### **Confidentiality**

During the study the researcher was required to remain in the room throughout test administration to maintain a confidential testing environment. The assessments were collected by the researcher immediately upon completion by the resident and placed into individual, sealed envelopes. No external identification appeared on the outside of the envelope. Prior to participation in this study all participants in the study were required to sign a consent document that is included in the required IRB application process of the health network (see Appendix A).

### **Procedures for Data Collection**

This proposed study will utilize a quantitative research design to obtain data from participants. Participation in this study is totally voluntary. All electronic files will be stored in a database on a locked computer which only this researcher has access through a password and individual identifying name. All paper assessment results will be kept under lock and key in the

possession of the researcher only. After the results of the data is published the data will be stored on an encrypted thumb drive and placed in a safe at the residence of the researcher. This safe is fireproof and in an electronically secured residence. The data will be kept for ten years in this location. Following that time, the thumb drive will be destroyed at a bonded company specializing in shredding of documentation devices.

Results from the MSCEIT were calculated for means, medians and standard deviations in all emotional intelligence scores. The mean value of the MSCEIT were calculated by reviewing the total of all emotional intelligence scores and dividing that number by the number of participants. This yielded the mean emotional intelligence score of all residents. The median score was calculated by reviewing the scores on the MSCEIT to determine the point that divides the scores evenly in half. This value will represent the median or equal number of scores that fall above and below that point. The mode score on the MSCEIT was determined by identifying the most frequently occurring score on the MCEIT. Results from the MAI were calculated for means, medians and standard deviations in all emotional intelligence scores. The mean value of the MAI was calculated by reviewing the total of all emotional intelligence scores and dividing that number by the number of participants. This yielded the mean emotional intelligence score of all residents. The median score was calculated by reviewing the scores on the MAI to determine the point that divides the scores evenly in half. This value represented the median or equal number of scores that fall above and below that point. The mode score on the MAI was determined by identifying the most frequently occurring score on the MAI.

The Pierson Product Moment assessment was used to determine if a correlation between metacognition and emotional intelligence exists. If there was a skewed distribution the Spearman Rank assessment would be used. Multivariate linear regression analysis was applied,

independently, to the metacognition and emotional intelligence results to determine if age, gender, years of residency training and reflective scores independently predicted emotional intelligence and metacognitive scores. The metacognitive awareness of each family practice resident was assessed by the application of the quantitative Metacognitive Awareness Inventory (MAI) developed by Schraw & Dennison (1994).

### **Procedures for Data Analysis**

All quantitative data was analyzed using IBM Statistical Package for the Social Sciences (SPSS), version 23 (Armonk, 2016). Discerning the type of quantitative assessments used in this study resulted from a review of (Creswell, 2014, p.157). This study described groups of measurements referred to as descriptive statistics and inferential statistics used to make inferences and judgements by using probability (Mc Call, 1970). A quantitative methodology and correlational analysis using Pearson product moment correlation coefficients or Spearman's rank correlation coefficients was conducted on both sets of data. The use of these assessments as "statistically reliable and valid assessment instruments, cited by other authors & accepted scales of measurement" (Creswell, 2014, p.157) is found in the work of Mc Call (1970, p.108-314).

Additional multivariate linear regression analysis was conducted to determine the independent/adjusted contributions of age, gender, and residency year and reflective score on the outcomes of emotional intelligence and metacognition identified in McCall (1970, p.103). The analysis of quantitative data was determined by the process of identifying themes from the collected responses to the following questions: When the concepts of emotional intelligence and metacognition were evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident? What influence did age, sex and

residency year have on the emotional intelligence and metacognitive ability of the resident?

What influence did metacognition and emotional intelligence have on the reflective practice of the resident?

### **Potential Limitations**

Limitations included the selection of only Family Practice Residents for this study which defined this as a homogenous sample who all worked for the same healthcare network in two states, Pennsylvania and New Jersey. The proposed sample size was a total of 36 residents however, there were less than 36 residents in the sample size and this researcher is alert to the limitations this placed on the study.

### **Ethical Considerations**

This researcher functioned as an internal leadership consultant to the Family Practice Residency faculty and two chief residents in the program. To maintain a presence throughout this study this researcher clearly articulated his role in the study from its inception to completion. This researcher followed all ethical principles and guidelines for research involving human subjects as identified in the Belmont report (Belmont, 1979). As noted in the Belmont report (Belmont, 1979) respect for persons is an important element of research. Respect for persons in this study was demonstrated by the following: each resident will be given the opportunity to participate or not participate in the study. Information about the study will be discussed with the resident two weeks before the study is initiated. Clarity in defining the study to the resident was essential. Checking for comprehension of the information with the resident during the informational meeting was a consistent practice. Voluntariness was addressed in this study. Participation in this study was totally voluntary. Agreement to participate or decline participation was free from coercion or undue influence by this researcher. Demonstrating

beneficence to those participating or not participating in this study was evident by treating each individual with respect. Respecting their decision to participate or decline participation without the fear of any harm was communicated by the researcher. The researcher communicated the potential of maximizing the possible benefits of participating in the program. These were discussed with the resident and framed as insights gained from the assessments taken in the research study. Understanding the results of their emotional intelligence, metacognition and reflective practice assessments provided potential opportunities for the resident to use these insights to improve their professional practice specifically, interpersonal skills and communication. Minimizing harms was addressed by maintaining the highest levels of confidentiality in working with residents' data and treating the resident with respect throughout the study. Justice in this study was addressed by identifying a population, family practice residents, who potentially benefit from the results of this study and offering them the opportunity to voluntarily participate or decline participation in the study without fear of harm. There were no public or private funds received by this researcher for this study.

Recognizing the potential for experimenter bias in this study the researcher had chosen a quantitative research design relying on mathematical and statistical analysis in assessing results definitively. The researcher is ethically bound to reporting the quantitative results honestly.

## **CHAPTER 4**

### **RESEARCH RESULTS**

This study presented a new and emerging topic using an integrated research methodology. The focus of this study examined the relationship between emotional intelligence and metacognition and their influence on reflective practice. The literature review in Chapter 2 established a rationale for exploring this emerging topic. This quantitative correlational study posed the following questions:

1. When the concepts of emotional intelligence and metacognition were evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident?
2. What influence did age, sex and residency year have on the emotional intelligence and metacognitive ability of the medical resident?
3. What influence did metacognition and emotional intelligence have on the reflective practice of the medical resident?

Key instruments used in the collection of data for this study were all validated and included a web based assessment to determine emotional intelligence (MSCEIT) and two paper and pencil assessments (MAI and Groningan). Chapter 4 examines the study's findings and results which include: a demographic analysis of those who completed the study, correlational analysis between MSCEIT and MAI scores as well as the impact of residency year, MSCEIT and MAI scores on the Groningan score.

## Statistical Analysis

Data was collected from Family practice residents by this researcher and all analyses were conducted using IBM SPSS Statistics for Windows, Version 23 (Armonk, NY: IBM Corp), with  $p < .05$  denoting statistical significance. A total of 36 residents were approached for study participation. This was presented as a voluntary study to all residents in the Family practice residency programs in the St Luke's University Health Network. Twenty-five residents participated in the study. There were 19 females (76%) and 6 males (24%), with residency year subdivided into 10 first year residents (40%), 10 second year residents (40%), and 5 third year residents (20%). Descriptive statistics were used "to provide simple summaries of the sample and the measures" (Trochum, 2006, p.1). Simple data analysis was conducted and the results are illustrated through the use of tables. Table 1 presents mean (standard deviation) MSCEIT, MAI, and Groningen Scores by gender and residency year.

Table 1.

### Score Values by Gender and Residency Year

Mean Scores (Standard Deviation)	Gender		Residency Year			Total
	Female (n=19)	Male (n=6)	First (n=10)	Second (n=10)	Third (n=5)	
MSCEIT	96.6 (16.3)	102.2 (6.7)	92.4 (13.6)	102.2 (17.2)	100.6 (8.2)	98.0 (14.6)
MAI	204.4 (22.5)	196.0 (15.0)	201.2 (23.4)	202.2 (18.9)	205.0 (24.4)	202.4 (21.0)
GRONINGEN	86.5 (5.9)	86.5 (6.1)	85.9 (6.1)	87.4 (4.6)	85.8 (8.3)	86.5 (5.8)

Note:

\* MSCEIT scoring ranges: 50 – 150 max. with 100 being defined as competent

\* MAI scoring ranges: 52 – 260 max. Higher scores on the MAI are indicative of stronger metacognitive ability.



\* Groningen scoring: 23- 115 max. Higher scores in the Groningen represent greater reflective ability.

Descriptive outcomes were reported for all data (means and standard deviations for continuous variables, frequencies and percentages for categorical variables).

### **Research Question 1**

Research Question I asked, When the concepts of emotional intelligence and metacognition are evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident? To determine the magnitude of the association between MSCEIT (emotional intelligence) and MAI (meta cognition), a Pearson's product moment correlation coefficient was calculated. The Pearson product moment correlation (Pearson's  $r$ ) is "probably the most common of all correlational coefficients" (Leidy & Ormond, 2005, p.275). The coefficient of + 1 or -1 is an indication of an existing relationship between variables. The correlation between MSCEIT and MAI scores indicated a very weak negative association ( $r = -.08$ ). As one score increased, the other score decreased slightly, for example, emotional intelligence increased and metacognition decreased slightly. This study finding indicated no correlation between emotional intelligence and metacognition, the null hypothesis was not rejected. However, the correlation coefficient was not statistically significant ( $p = .35$ ), suggesting that other variables may better explain the variance in each score. This suggests a presence of other confounders or other variables not measured in this study which may have contributed to these findings. These are discussed in the findings section of this chapter.

## Research Question 2

Research question 2 was inquired, What influence did age, gender and residency year have on the emotional intelligence and metacognitive ability of the medical resident? To determine the degree to which self-reflection was predicted by both emotional intelligence and meta cognition, a multivariate direct linear regression model was constructed, with the Groningen Score as the dependent variable, and the MSCEIT and MAI scores as independent variables. Residency year was included as an additional independent variable, with first years compared to a combined second and third year group due to the small sample size for third year residents ( $n = 5$ ). Using the common “rule of thumb” for linear regression of 5-15 subjects per independent predictor, as described by Tabachnick and Fidell (2007), the overall sample size was deemed acceptable. Including the three independent variables would not increase the likelihood of an overfit and create an unstable model. Additionally, there were no extreme outlier values. Therefore, regression modeling proceeded as planned.

What influence did the residents’ gender have on their emotional intelligence and metacognitive ability? (see Table 1). Gender was not included as an independent variable because of the small sample size for males ( $n = 6$ ). This was an area of the research which this researcher hoped would offer some insight into a portion of the second research question i.e. the MSCEIT scores between females and males appear to be descriptively different but not statistically significant because of the small sample size ( $n=6$ ) of those males who participated in the study. It also appears the emotional intelligence scores of residents in their first year are descriptively lower than those in both second and third year of the residency program. However, with a small sample size of six males who participated in this study it was not possible to include these results in the study.

### Research Question 3

Research question 3 asked, What influence did emotional intelligence, metacognition and residency year have on the reflective practice of the resident? This question was evaluated by the use of a linear regression, assessing the accountability of these three items on the ability to reflect as a family practice resident. Table 2 presents results of multivariate linear regression. The overall model fit was very poor (adjusted  $R^2 = -.08$ ), suggesting that residency year, MSCEIT, and MAI account for very little of the variance in Groningen Scores as a measure of self-reflection. Additionally, none of these independent variables significantly predicted Groningen Score (p-values = .35 – .84).

Table 2.

Multivariate Direct Linear Regression of Independent Predictors  
of Self-Reflection (Groningen Score)

Independent Variable	Regression Coefficient (95% Confidence Interval)	p-value
MSCEIT	.08 (-.15 to .22)	.72
MAI	.21 (-.07 to .18)	.35
RESIDENCY YEAR	.05 (-.49 to 6.0)	.84

### **Descriptive Analysis of Branch MSCEIT Scores**

There are four branch scores identified in the MSCEIT assessment. They are defined as follows:

1. Perceiving Emotion (PE) – the individuals’ ability to recognize how they are feeling and how those around them are feeling.
2. Facilitating Thought (FT) – the individuals’ ability to employ feelings to improve their thinking and subsequently improve problem solving, reasoning, decision making.
3. Understanding Emotion (UE) – understanding what leads to various emotions.
4. Managing Emotions (ME) - the individual’s ability to manage emotions successfully.

A comprehensive review of the study data, using descriptive statistics of measurement (i.e. frequency and central tendency) was conducted to examine other findings of the study not recognized in the earlier statistical analysis. This researcher used the following questions relative to the MSCIT branch assessment scores in pursuit of additional data from the study: (a) Which group, male or female residents, scored higher in each of the branch mean scores and what are the effects of this in their clinical practice? and (b) Did all MSCEIT branch scores improve in each year of residency by each gender?

The first reflection question, Which residents, when grouped by gender, achieved a higher mean score in each branch of the MSCEIT and what are the effects of this in their clinical practice? It was evident that female residents scored higher than males. In fact, females in the perceived emotion (PE) branch mean scored 101.2 (Female) and males scored 96.8 (Male). Male residents scored slightly higher in the facilitating thought (FT) branch mean score 99.3 (Male), where female residents scored 97.2. Male residents additionally scored higher in the

understanding emotion (UE) branch mean score 101.0 (Male), while females scored 95.7 (Female). Male residents scored higher in managing emotions (ME) branch mean score 107.8 (Males), while females scored lower at 99.0 (Females).

The (PE) results illuminate female residents in the Family Practice residency program as having a stronger ability than male residents in the same program to perceive their own feelings and the feelings of others. This may be demonstrated in a patient care setting by the female resident being aware of her own feelings in the treatment of an elderly grandmother suffering from rheumatoid arthritis because she closely resembles her own mother who also suffers from the same debilitating disorder. Male residents in the Family Practice residency program have, descriptively, scored higher than female residents in the same program to employ feelings into their thinking process (FT). This may be demonstrated in their ability to utilize feelings and harness them to make objective decisions and problem solve the treatment of patients. This may be evident in the successful hospitalization of a chronically manipulative adolescent patient who presents with a history of drug abuse and anger. Male residents in the Family Practice residency program scored higher in their ability to understand what leads to various emotions (UE) when compared to female residents. These results may be demonstrated by male residents understanding their feelings i.e. love, sadness, loss, regret, sorrow associated with counseling a brother and sister who are seeking advice on placement of their elderly father who presented with early symptoms of senile dementia. Male residents in the Family Practice residency program scored higher in managing their emotions (ME) when compared to female residents. Managing emotions is defined as successfully coping with emotions by understanding and thinking about the emotions instead of acting them out. This may also be defined as emotional regulation. These results may be demonstrated by the male residents' medical, legal and

emotional support and guidance to his female patient who presented with injuries resulting from an abusive situation.

The second reflection question asked, Did all MSCEIT branch scores improve in each year of residency by each gender? First year male Family Practice residents scored higher in three branch scores: Facilitating Thought, Understanding Emotion and Managing Emotion when compared to female first year residents. Female Family Practice Residents scored higher in Perceiving Emotion. These findings in the first year residency group are consistent with the overall branch score findings. It may be female residents are more aware of their own emotions and those of others around them in contrast to male residents who may be linking cognition to feelings before they express emotions. The three branch scores are illustrated in Table 3.

Table 3.

MSCEIT Branch Mean Scores First Year Family Practice Residents

MSCEIT Branches	PE	FT	UE	ME
Males	86.5	102.5	105	112.5
Females	97.5	92.1	91.1	93.2

Second year male Family Practice residents scored higher than female Family Practice residents in all four branch scores of the MSCEIT but branch scores of the male residents did not improve over the first year male residents branch scores. Male residents made a significant improvement in their perceiving emotions (PE) score. It may be male residents, during their second year of residency, improved so dramatically in perceiving emotions as a result of allowing themselves more time to experience feeling the emotion without pre-empting the feeling with cognition. Female residents in their second year scored higher in only one branch, facilitating thinking, than the first year scores. This may be an effort to employ feelings about

clinical situations in order to improve their thinking about a diagnosis or care of a patient. The four branch scores are illustrated in Table 4.

Table 4.

MSCEIT Branch Mean Scores Second Year Family Practice Residents

<u>MSCEIT Branches</u>	<u>PE</u>	<u>FT</u>	<u>UR</u>	<u>ME</u>
Males	105.3	93.5	94.5	107
Females	93.75	93.1	84.0	92.0

Third year male Family Practice residents scored lower in perceiving emotions and managing emotions in contrast to their second year male branch scores. However, third year male residents scored higher in facilitating thought and understanding emotion. It may be the third year male residents valued growth in facilitating thought as a result of wanting to be perceived as stronger in problem solving and decision making in their final year of residency. Third year female residents scored higher branch scores in only perceiving emotions and understanding emotions in contrast to their second year scores. This may be a result of female residents wanting to be able to first identify the emotions being generated in them as a result of certain types of patients who they may be assigned to treat. The four branch scores are illustrated in Table 5.

Table 5.

MSCEIT Branch Mean Scores Third Year Family Practice Residents

<u>MSCEIT Branches</u>	<u>PE</u>	<u>FT</u>	<u>UE</u>	<u>ME</u>
Males	98.5	102	103	104
Females	94.6	89.6	107.6	103.3

### Descriptive Analysis of MAI scores

A deeper descriptive analysis of the Metacognitive Assessment Inventory (MAI) scores revealed the following mean MAI scores by gender and residency year. MAI scores in male Family Practice residents varied in all three years with a low mean score (192.5) in the second year to a higher mean score (199.0) in the third year of residency. Female Family Practice resident MAI scores in the first year of residency exceeded the highest MAI scores achieved by male residents in their third year of residency. Female residents MAI scores grew in each successive residency year. What may be related to this growth in a female Family Practice resident's ability to think about their thinking are patterns which emerge in the branch scores of the MSCEIT in the third year of residency. MSCEIT branch scores identified as understanding emotions (UE) and managing emotions (ME) rose during the third year for female residents. This rise may be the result of the female residents applying reason and cognition toward understanding their emotions, higher UE scores in the MSCEIT branch score are indicative of this. This may be the result also of female residents managing their emotions by judiciously thinking about their emotions before responding to them. Mean scores by residency and gender are illustrated in Table 6.

Table 6.

#### MAI Mean Scores by Residency Year and Gender

<u>Residency Year</u>	<u>Males</u>	<u>Females</u>
First Year Residents	196.5	202.0
Second Year Residents	192.5	204.6
Third Year Residents	199.0	209.0



\* MAI scoring ranges: 52 – 260 max. Higher scores on the MAI are indicative of stronger metacognitive ability.

### **Descriptive Analysis of the Groningen Assessment**

A deeper descriptive analysis of the Groningen Assessment scores revealed the following mean scores in the Groningen by gender and residency year. The Groningen assessment reports the ability of the individual to be reflective. Higher scores on the Groningen are indicative of stronger reflective ability. What may be related to the growth in the Groningen scores in female Family practice residents over three years? Exploring the progression of metacognitive ability in female Family Practice residents over three years may provide some insights. While metacognitive scores were ascending each year over three years for female Family Practice residents, a similar pattern is evident in the Groningen scores for the same population. What may be happening: as female residents consider their thinking about her thinking (the process of metacognition) they were also growing in their ability to reflect. The reverse may also be true, as female residents grew in their ability to reflect (Groningen results) they also grew in their ability to think about their thinking (MAI results). Groningen mean scores by residency year and gender are illustrated in Table 7.

Table 7.

#### Groningen Mean Scores by Residency Year and Gender

<u>Residency Year</u>	<u>Males</u>	<u>Females</u>
First Year Residents	94.0	83.8
Second Year Residents	84.5	88.1
Third Year Residents	81.0	89.0

\*Groningen scoring: 23- 115 max. Higher scores in the Groningen represent greater reflective ability.

### **Summary of Findings**

Chapter 4 presented results of the data analysis used to answer the following research questions.

1. When the concepts of emotional intelligence and metacognition are evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident?
2. What influence did age, gender and residency year have on the emotional intelligence and metacognitive ability of the medical resident?
3. What influence did emotional intelligence, metacognition and residency year have on the reflective practice of the resident?

The study findings have yielded data that when united with this researchers reflective comments provided a rich illustration of learning from the methods and results. The statistical data yielded from the study provided factual information taken from the aggregated results of the assessments. All assessments used in the study were valid and reliable and affirmed by an analysis of each as reported in the literature in Chapter 3. Findings from the first question, When the concepts of emotional intelligence and metacognition were evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident? Those results indicated that there was no correlational relationship between emotional intelligence and metacognition in the study group of 25 Family Practice residents ( $r = -.08$ ). The null hypothesis in this study was not rejected. The use of Family Practice residents who participated in the study were selected from the same organization. The researcher during the

analysis section pondered the following questions: a) What would results look like from a study where multiple Family Practice residency programs from different geographic regions participate?, (b) How would a larger number of Family Practice residents, participating in a replicative study, affect results?, and (c) Did the study design i.e. all residents taking the three assessments at the same time, impact on the results i.e. observations that others were finishing quicker and as a result completing the assessment without discerning the question fully?

Question 2. What influence did gender and residency year have on the emotional intelligence and metacognitive ability of the medical resident? No relational significance was identified in any of these variables. As noted previously, a small number of males participated in the study which impacted on the relevance of gender in the study. There is a descriptively higher MSCEIT score in females in the study however these were not statistically significant.

Question 3. What influence did emotional intelligence, metacognition and residency year have on the reflective practice of the resident? The statistical analysis of this question (adjusted  $R^2 = -.08$ ), suggested that residency year, MSCEIT, and MAI account for very little of the variance in Groningen Scores as a measure of self-reflection. Additionally, none of these independent variables significantly predicted Groningen Score (p-values = .35 – .84). A relevant topic of discernment in reviewing these results must include the selection of the three assessments used in the study. While each are independently valid and reliable assessments the questions relative to this study are: did the use of these particular assessments in an integrative design contribute to the results? This question can only be answered by completing a replicative study and analyzing the data to determine if similar results were realized. If similar results are obtained it may identify a need to apply different assessments and apply them in future studies.

Reflective question 4, Which residents, when grouped by gender, achieved a higher mean score in each branch of the MSCEIT and what may be the effects of this in their clinical practice? Female residents scored higher in the perceived emotion (PE) branch mean score 101.2 (Female) and males scored 96.8 (Male). This may be apparent to faculty members of the residency program when, during the discussion of patients, a female resident would routinely mention how they feel about the patient and their awareness of the patients' feelings. Male residents scored higher in the facilitating thought (FT) branch mean score 99.3 (Male) and females scored 97.2 (Female). This may be apparent in male residents including feelings about a patient when reporting history and physical findings which influenced their thinking about a treatment plan. Male residents scored higher in the understanding emotion (UE) branch mean score 101.0 (Male), 95.7 (Female). This may be evident in a male resident reporting to the attending physician why he feels a certain way about a patient. Male residents scored higher in managing emotions (ME) branch mean score 107.8 (Males), 99.0 (Females). This may be observable by the controlled reaction of male residents to emotionally charged, unanticipated events within the Clinic i.e. the presentation of a demanding, disgruntled patient.

Reflective question 5, Did all MSCEIT branch scores improve in each year of residency by gender? Considering year in residency and gender none of the branch scores improved consistently from residency year one to residency year three. However, female and male residents demonstrated growth which vacillated over the three years of residency. This may be a finding that demonstrates how emotional intelligence increases in Family Practice residents. Additional studies are needed to further explain the growth of a residents' emotional intelligence over time. Descriptive statistical analysis can only be enriched by continued study.

A review of the Metacognitive Assessment Inventory (MAI) mean scores identified growth in MAI scores by female Family Practice Residents in all three year of residency. The Groningen Affective Ability scale mean scores were evaluated by residency year and gender. Continuous growth was noted in the scores of female Family Practice residents in the Groningen scores. Exploring the progression of metacognitive ability in female Family Practice residents over three years may provide some insights about this growth. While metacognitive scores were ascending each year over three years for female Family Practice residents, a similar pattern is evident in the Groningen scores for the same population. This may have occurred as female residents thought about their thinking (the process of metacognition) they were also growing in their ability to be reflect.

### Chapter Summary

In this chapter the research methodology was reviewed and the results of the quantitative correlational study were examined. Tables were used to identify the statistical findings. A summary of the findings relative to each study question was presented, two additional questions were used for reflection and united with comments about the study variables. Chapter 5 includes: findings, analysis and statistical concerns, limitations, suggestions for future research and a conclusion.

## **CHAPTER 5**

### **Conclusion and Recommendations**

This quantitative correlational study examined the relationship between emotional intelligence and metacognition and its influence on reflection in Family residents. The data analyzed in Chapter 4 will be discussed capturing the significance in the findings. Identification of confounding variables in the study are illuminated along with their potential influence. Quantitative research was used in the collection of data for the study. Three valid and reliable assessment tools were used in this study: Mayer-Salovey & Caruso Emotional Intelligence Test, Metacognitive Awareness Inventory and the Groningen Reflective Ability Scale.

### **Research Questions**

The following research questions were used in this study:

1. When the concepts of emotional intelligence and metacognition were evaluated together, what correlations, if any, were found between emotional intelligence and metacognition in the medical resident?
2. What influence did age, sex and residency year have on the emotional intelligence and metacognitive ability of the resident?
3. What influence did metacognition and emotional intelligence have on the reflective practice of the resident?

The null hypotheses of this study was defined as finding no relationship between emotional intelligence and metacognition. The alternative hypotheses in this study was finding a relationship between emotional intelligence and metacognition.

## Analysis and Statistical Concerns

The tools used to assess the data statistically did not engender concerns relative to the accuracy of the results. The Pearson product moment correlation is a widely used and accepted assessment. However, the sample size in this study was too small to provide enough power to conclude p-values of at least .01. This study did not refute the null hypothesis i.e. no relationship between emotional intelligence and metacognition was found.

A significant point to be made here is the small number of respondents, particularly males (n=6) influenced the validity of the study results. A very strong score of .8, for example, would have indicated nearly 100 % of the residency year, MSCEIT and MAI scores impacted on the Groningen self-reflection score. Additionally, the study findings ( -.08 ) demonstrated no relationship between residency year, MSCEIT and MAI scores impacting the Groningen self-reflection score. A comprehensive review of the study data, using descriptive statistics of measurement i.e. frequency and central tendency, was conducted to examine other findings of the study not recognized in the earlier statistical analysis. Female residents scored higher in the perceived emotion (PE) branch mean score 101.2 (Female), 96.8 (Male). Male residents scored higher in the facilitating thought (FT) branch mean score 99.3 (Male), 97.2 (Female). Male residents scored higher in the understanding emotion (UE) branch mean score 101.0 (Male), 95.7 (Female). Male residents scored higher in managing emotions (ME) branch mean score 107.8 (Males), 99.0 (Females). The descriptive analysis of the branch MSCEIT scores may indicate the female Family Practice residents in the study are stronger in perceiving emotions and may indicate male Family practice residents in this study are stronger in applying cognition to their feelings before expressing them. A review of the Metacognitive Assessment Inventory (MAI) mean scores identified growth in MAI scores by female Family Practice Residents in all three

year of residency. The Groningen Affective Ability scale mean scores were evaluated by residency year and gender. Continuous growth was noted in the scores of female Family Practice residents in the Groningen scores. While metacognitive scores were ascending each year over three years for female Family Practice residents, a similar pattern is evident in the Groningen scores for the same population. What may be happening: as female residents thought about their thinking (the process of metacognition) they were also growing in their ability to be reflective.

## **Conclusions**

The descriptive statistics of this study identified gender difference in the branches of emotional intelligence, awareness of metacognition and use of reflection in Family Practice Residents. The influence of gender on physician practice style has been reported in the literature. Female residents “are engaged in more positive talk, partnership building, question – asking, and information giving” (Bertakis, Helms, Callahan, Azari, Robbins, 1995 p. 407). Chambers & Campbell (1995) identified female physicians spending more time with their patients, female physicians average more than five minutes per patient than male physicians. Pineault et al. (2017) noted female physicians were perceived as more empathic than male physicians. These relational characteristics of female physicians when examined in light of the descriptive findings of this study, i.e. higher branch perceiving scores in emotional intelligence by Female Family Practice Residents, may be revealing the underpinnings of this behavior. Perhaps the empathic, engaging, information giving and relational presentation of Female Family Practice Residents noted in the literature may be influenced by strong perceiving emotional intelligence of Female Family Practice Residents. This opens up an exciting new area of research not previously examined in the literature. The implications of this study may afford



additional research into how female Family Practice residents draw upon this aspect of their emotional intelligence and apply it to their relationships with patients.

One might expect Female Family Practice residents who are aware of other's feelings to be engaged in longer conversations focused on understanding the emotions expressed by the patient. Nicolai & Demmel (2007) identified female physicians engaging in more "emotionally focused" talk and preferred to be thought of as empathic. The Family Residency program coordinator from one of the study sites where this research was conducted identified these behaviors relative to gender. Eato (K. Eato, personal communication, June 28, 2017) stated "females spend more time with patients, females are more empathetic, they routinely huddle in the morning before the start of office hours, they appear more intuitive". These anecdotal comments may offer additional insights into how higher branch perceiving scores in emotional intelligence are manifested in the behaviors of Female Residents. The literature identified male Family Practice residents as increasingly more satisfied with the organizational facets of their work (Chambers & Campbell, 1995). Saletti-Cuesta, Delgado, Ortiz-Gomez & Lopez – Fernandez (2013) identified these important facets as: knowledge of institutional resources, computer systems & continuing education. The Family Residency program coordinator from one of the study sites where this research was conducted similarly identified male Family Practice Residents behaviors by the following characteristics: "males tend to be more policy driven, need more prompting, are concerned more with the tasks of their practice like charting, review their employment contracts for days before signing them in contrast to female residents who sign upon brief review with few questions and they do not take as long when seeing patients". In this study male Family Practice Residents scored higher in the branch emotional

intelligence scores aligned to cognitive emotional responses or thinking about their feelings. As a result, one might expect male residents to be less affectively focused and more task focused.

In residency programs gender of the preceptor influenced what is taught and how (Burge, 2000). The residency sites where this study was conducted are composed of 70% female preceptors (K. Eato, personal communication, June 28, 2017). Female preceptors tend to teach preventive medicine affording female residents an opportunity to work independently during history taking but less independently during physical exams (Carney, Dietrich, Eliassen, Pipas & Donahue, 2000). Male preceptors teach more chronic illness care and afford male residents more independence when conducting physical exams (Carney et al., 2000). The growing metacognitive ability of females expressed in this study may be influenced by their female preceptors. The influence of independence, afforded to female residents during history taking with patients, may give them time to practice metacognitive thinking i.e. thinking about their thinking relative to the patients' history and their processing of patient information. This may be evident in the growth of their metacognitive skills over three years of residency. This independent time during history taking may also affect their growth in reflective ability seen in the results of this study. The study findings, relative to male Family Practice Residents indicate stronger branch scores in the cognitive emotional branches of emotional intelligence, fluctuations in metacognitive skills over 4 years and lower reflective scores when compared to Female Family Practice residents. The implications of these findings in this study may offer, through future research, a deeper understanding of the relationship between being more cognitively focused and demonstrated task behavior in male Family Practice residents. There is a deficit of research in this area of Family Practice residency research. Given the influence of the American

College of Graduate Medical Education in assessing competencies of Family Practice residents one might expect to see more research in this area in the near future.

Humanism is fostered in medicine through art and reflection (Gooding, Quinn, Martin, Charrow, Katz, 2016). Medical schools and hospitals have begun some very interesting work incorporating art to preserve empathy. The Brigham and Women's Hospital Department of Medicine's Humanistic Curriculum was created in 1997 for the purpose of fostering humanism in medical residents. Each month, residents in the first year of residency training meet to read a poem or short article and reflect on its' relevance to their clinical practice. Additionally, this program has partnered with the Boston Museum of Fine Arts to include an evening of reflection through art in the curriculum. These programs have produced the following themes from participating residents: greater commitment to self- care, connecting with patients as human beings, practicing mindfulness, and a desire to return to the museum. The results from these experiences, which began in 2013, has fostered and enhanced the reflective ability of residents (Gooding, Quinn, Martin, Charrow, Katz, 2016).

This study identified reflective practice in male and female Family practice residents. The descriptive data identified females scoring higher in reflective practice compared to males. Seeking an opportunity to raise the reflective practice of both male and female residents, I have initiated, this academic year of 2018, a new focus on reflective practice with all chief residents in the St. Luke's Health Network. Reflective practice and journaling has been incorporated into the leadership development curriculum of chief residents. Monthly leadership development meetings with each chief resident provide opportunities to discuss their reflective practice journal entries. I intend to incorporate some elements of the Brigham & Women's program following a site visit in 2018.

I believe the tools used in this study did not influence the accuracy of the results and should be used again in replicative studies. This study identified differences, by gender, in the branches of emotional intelligence, awareness of metacognition and use of reflection. Those who are educators in the field of medicine need to know more about the influence of these gender differences on emotional intelligence in Family Practice resident's and if they influence the ability of a resident to communicate effectively in a clinical setting. Female Family practice residents perform stronger in perceiving emotional intelligence and male Family Practice residents perform stronger in the cognitive areas of emotional intelligence.

### **Limitations**

The proposed sample size was a total of 36 residents however, only 25 residents participated in the voluntary study. This small sample size limited the number of males who participated in the study. A confounding variable in a quantitative experiment is defined as variable that was not accounted for in the experiment. Limitations of this quantitative study must also consider the element of unknown confounding variables that were not accounted for and identify limitations in the study methodology. A confounding variable which potentially may explain the variance in each score may include: assessing a singular Family practice residency program within one organization (St. Luke's University Health Network) vs. assessing several Family practice residency programs from other health care organizations in eastern Pennsylvania and western New Jersey. This suggests the possibility that organizational culture and residency culture played some role in the results. Another confounding variable in the study was realized, post study, during individual discussions with the residents who participated in the study. It was learned by the researcher that during the week in which the study was conducted first and second year residents participating in the study were also preparing for national competency exams.

This variable was not anticipated in the research design and is considered another confounding variable influencing the results of this study. The study used three assessment instruments that were assessed, prior to the study, for validity and reliability as independent assessments. However, because this unique quantitative study deployed the application of these three assessments, for the first time in tandem, these results may illuminate several possible limitations of their application in the study by the following questions: Are the assessments used in the study influencing and producing confounding variables because of their integrated application? This raises another question or limitation: Are there other assessments that should be used, in tandem, to determine the answers to all three questions posed in the study? The study identified other limitations needing to be considered in future replicative studies i.e. larger sample size, age and the use of a control group.

### **Suggestions for Future Research**

The literature review identified where a gap in the literature exists in examining the relationship between emotional intelligence and metacognition and its' influence on reflective practice in medical residency. This study was unable to inform by its' results additional data to disprove the null hypothesis however, it opens a bright future for research on this topic. Researchers need to conduct additional research to expand the scientific knowledge of how or whether there is a relationship between emotional intelligence and metacognition and reflective practice in medical residency. Exploring the progression of metacognitive ability in female Family Practice residents over three years may provide some insights about this growth identified in the study.

The following is a summary of the recommendations for future research:

- Increase the number of residents participating in future studies for increasing generalizability and the ability to obtain statistical power.
- Include additional Family Practice residency programs from other regions
- Conduct a replicative study using the same assessments to either rule out or definitively answering the question of confounding variable interactions when used in tandem in a study
- Explore assessing other variables i.e. age, MD vs. DO training and gender of the program director.
- Introduce education in emotional intelligence and metacognition before the study and identify a control group receiving no education to determine if education influences scores.
- Additional research should include a qualitative and quantitative or mixed methodology approach in the studying the relationship between emotional intelligence and metacognition and their influence on reflective practice in medical residents.
- Explore the influence of emotional intelligence, metacognition and reflection on performance emphasizing the ACGME competencies to determine if there is predictive value in clinical performance.
- Furthermore, it will be important to explore what influences these differences in metacognitive ability have on emotional intelligence and how they are expressed in clinical care of patients.

## Conclusion

The study identified a difference in metacognitive ability, by gender, in Family Practice residents. The study found female Family Practice residents, in each year of residency, performed stronger in the practice of reflection. I have found these concepts to be intertwined by examining the study descriptive data and believe I have only scratched the surface in understanding the complexities of these dynamic interactions.

In further studies after this preliminary exploration, it will be important to examine the why of these findings on reflective practice and determine if emotional intelligence and metacognition contribute and if so in what way. We need to explore in greater detail, by quantitative and qualitative methods, our knowledge about the interaction between emotional intelligence and metacognition. We need to determine if there are more suitable methods and assessments for measuring and describing the interaction between emotional intelligence and metacognition and their influence on reflective practice. I have come to realize that the question of metacognition, thinking about thinking, may indeed be different than the process of thinking about feeling. The implications of this awareness leads to the pursuit of additional study and different hypothesis testing.

Continuing research should be conducted to expand the knowledge surrounding the integration of emotional intelligence and metacognition as integrated concepts in medical residency education. The findings in this study should not be generalized based on the quantitative results it produced. Continued study of these two concepts will determine how or if these concepts are integrated and provide additional insights into improving resident interpersonal and communication skills. The overarching importance of continued research and understanding these concepts is improving the care of patients.

## References

- Armstrong, P.W. (2007). A time for transformative leadership in academic health sciences. *Clinical Investigative Medicine (Online)*.30(3) E127- E132.
- Arora, S., Russ, S., Petrides, K.V., Sirimanna P., Aggarwal, R., Darzi, A., Sevdalis, N. (2011). Emotional intelligence and stress in medical students performing surgical tasks. *Academic Medicine*. Vol. 86. No. 10.13111317. DOI: 10. 1097/ACM. OB. 013e31822bd7aa
- Aukes, L. C., Geertsma, J., Cohen-Schotanus, J., Zwierstra, R. P., Slaets, J. P. J. (2007). The development of a scale to measure personal reflection in medical practice and education. *Medical Education*. 177-182. DOI: 10.1080/01421590701299272
- Austin, E. J., Evans, P., Goldwater, R., Potter, V. (2005). A preliminary study of emotional intelligence, empathy and exam performance in first year medical students. *Personality and Individual Differences*. 39. 1395-1405. DOI: 10.1016/j.paid.2005.04.014
- Belmont Report (1979). <https://www.hhs.gov/orhp/regulations-and-policy/belmont-report/>
- Bertakis, K. D., Helms, J., Callahan, E. J., Azari, R., Robbins, J. A. (1995). The influence of gender on physician practice style. *Medical Care*. 407-416.
- Birks, E., McKendree, J., Watt, J. (2009). Emotional Intelligence and perceived stress in healthcare students: a multi-institutional, multi-professional survey. *Medical Education*. Vol. 9. 61. DOI: 10.1186/1472-6920/9/61
- Blackstone, A. (2012). *Principals of Sociological Inquiry. V 1.0*. University of Maine. ISBN: 13: 978-1-4533288-9-2.



- Bond, W. F., Deitrick, M., Arnold, D. C., Kostenbader, M., Barr, G. C., Kimmel, S. R., WorriLOW, C. C. (2004). Using Simulation to instruct emergency medicine resident in cognitive forcing strategies. *Academic Medicine*. 438-446. ISSN: 1040-2446
- Brackett, M. A., Salovey, P. (2006). Measuring emotional intelligence with the mayer-salovey-caruso emotional intelligence test (msceit). *Psicothema*. Vol 18. p. 34-41.
- Brackett, M. A., Mayer, J. D., (2003). Convergent, discriminant and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin*. 29.1147. Thousand Oaks, CA: Sage. DOI: 10.1177/014616720325496
- Brannick, M. T. (2013). Metacognition, OSCE performance anxiety and OSCE performance. *Medical Education*. 540-542. DOI: 10.1111/medu.12148
- Bubble, E. R. (2010). *The practice of social research*. Belmont, CA: Wadsworth Cengage.
- Burge, S., K. (2000). Gender and power in family medicine education. *Family Medicine*. 32. (9) 625-627.
- Chambers, R., Campbell, I. (1996). Gender difference in general practitioners at work. *British Journal of General Practice*. 46. 291-293.
- Chan, K., Petrisor, B., Bhandari, M. (2013). Emotional intelligence in orthopedic surgery residents. *Canadian Journal of Surgery*. Vol. 57. No 2. 89-93. DOI: 10.1503/cjs.022512
- Charmaz, K. (2005). The grounded theory method: and exploration and interpretation. In R. Emerson (Ed.). *Contemporary field research* (pp. 109-126). Boston: Little Brown.
- Cherry, M. G., Fletcher, I., O'Sullivan, H. (2014). Validating relationships among attachment, emotional intelligence and clinical communication. *Medical Education*. 48. 988-997. DOI: 10.1111/medu.12526

- Chew, B. H., Zain, A. M., Hass, F. (2013). Emotional intelligence and academic performance in first and final year medical students: a cross-sectional study. *Medical Education*. 13:44. 1-10. <http://www.biomedcentral.com/1472-6920/13/44>
- Coulehan, J. L. (1995). Tenderness and steadiness: emotions in medical practice. *Literature and Medicine*. 14. 222-236.
- Coulehan, J. L., Williams, P. C. (2001). Vanquishing virtue: the impact of medical education. *Academic Medicine*. 76. 598-605.
- Coulehan, J. L., Williams, P.C. (2001). Professional ethics and social activism: where have we been? where are we going? *Educating Physicians: Medical Student Professional Development and Social Change*. Iowa City, IA: Iowa Press, 49-69.
- Creswell, J. W. (2014). Educational research: planning, conducting, and evaluating quantitative and qualitative research. *Boston. Pearson, Inc.* 1-645.
- Creswell, J.W. (2013). *Qualitative inquiry & research design: choosing among five approaches* (3<sup>rd</sup> ed.). Los Angeles, CA: Sage Publications, Inc.
- Cuesta-Saletti, L., Delgado, A., Ortiz-gomez, T., Lopez-Fernandez, L., A. (2013). Gender differences in the perception of professional achievement in family medicine, Spain. *Rev esp salud pub.* (3) 221-38. DOI: 10.4321/S1135-57272013000300002.
- Defoe, D. (2013). Important notice to lawyers: the msceit emotional intelligence test will not show that you are crazy. *Psycholawlogy*. [www.psycholawlogy.com](http://www.psycholawlogy.com).
- Doherty, E. M., Cronin, P. A., Offiah, G. (2013). Emotional intelligence assessment in graduate entry medical school curriculum. *BMC Medical Educator*, vol. 38. London. DOI: 10.1186/1472-6920-13-38.

- Duffy, M.C., Azevedo, R., Sun, N. Z., Griscom, S.E., Stead, V., Crelinsten, L., Wiseman, J., Manlatis, T., Lachapelle, K. (2014). Team regulation in a simulated medical emergency:an in-depth analysis of cognitive, metacognitive, and affective process. *Instructional Science*. 43:401-426. DOI: 10.1007/s1125-014-9336-6
- Dunphy, B. C., Cantwell, R., Bourke, S., Fleming, M., Smith,B., Joseph, K.S., Dunphy, S. L. (2010). Cognitive elements in clinical decision making. *Advances in Health Sciences Education*. 15:229-250. DOI: 10.1007/s10459-009-0104-y
- Efkleides, A. (2009). The role of metacognitive experiences in the learning process. *Psicothema*. 27: 76-82. [www.psicothema.com](http://www.psicothema.com)
- Eichbaum, Q. G. (2014). Thinking about thinking and emotion: the metacognitive approach to medical humanities that integrates the humanities with basic and clinical science. *Original Research & Contributions*. 18(4). 64-75. DOI: 10.7812/TPP/14-027
- Epstein, R. M., Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA* Vol. 287: 226-235.
- Epstein, R. M., Siegel, D. J., Silberman, J. (2008). Self- monitoring in clinical practice a challenge for medical educators. *Journal of Continuing Education Health Professions*. 28 (1) 5-13. DOI:org10.1002/chp.149.
- Eubank, D., Gefken, D., Orzano, J., Ricci., R. (2012). Teaching adaptive leadership to family residents: what? why? how? *Family System Health*. 30(3) 241-252.  
<http://psycarticles/2012-22415-001>
- Fadiman, A. (1997). *The spirit catches you and you fall down: a hmong child, her american doctors, and the collision of two cultures*. New York, NY: Farrar. Straus and Giroux.

- Falcone, J., Claxton, R., Marshall, G. (2014). Communication skills training in surgical residency: a needs assessment and metacognition analysis of a difficult conversation objective structured clinical examination. *Journal of Surgical Education*. 71(3) 309-315. DOI: 10.1016/j.surg.2013.09.020
- Fleming, S. M., Lau, H. C. (2014). How to measure metacognition. *Frontiers of Neuroscience*. Vol.8. 443. 3-14. DOI: 10.3389/fnhum.2014.00443
- Freshman, B., Rubino, L. (2004). Emotional intelligence skills for maintaining social networks in healthcare organizations. *Hospital Topics*, 82,3, p.2. ABI/INFORM collection
- Gayanthri, N., Meenakshi, K. (2013). A literature review of emotional intelligence. *International Journal of Humanities and Social Science Invention*. Vol. 2. Issue 3. 42-51. ISSN (online):2319-7722
- Gooding, H. C., Quinn, M., Martin, B., Charrow, A., Katz, T. (2016). Fostering humanism in medicine through art and reflection. *Journal of Museum Education*. 41:2. 123-130. DOI: 10.1080/10598650.2016.1169732
- Grewal, D., Davidson, H. (2008). Emotional intelligence and graduate medical education. *JAMA*. Vol. 300. No.10. (reprinted)
- Heale, R., Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence Based Nursing*. January.
- Hilton, S. R., Slotnick, H. B., (2005). Proto-professionalism: how professionalization occurs across the continuum of medical education. *Medical Education*. Vol. 5. 58-65.
- Hinkle -Young, S., Watson, M. A. (2010). Physicians' emotional intelligence as a predictor of malpractice litigation: a conceptual review. *Medical Practice Management*. 170-174.

- Johnson, J. M., Stern, T. A. (2014). Teaching residents about emotional intelligence and its impact on leadership. *Academic Psychiatry*. 38. 510-513.
- Jensen, A. R., Wright, A. S., Lance, A. R., O'Brien, K. C., Pratt, C.D., Anastakis, D. J., Pellegrini, C. A., Horvath, K. D. (2007). The emotional intelligence of surgical residents: a descriptive study. *Association for Surgical Education*. 195. 5-10. DOI: 10.1016/j.amsurg.2007.08.049
- Jost, J. T., ((2012). Effects of system justification on willingness to protest. *Personality and Social Psychology Bulletin*. 38. 197-208.
- Julliard, K., Intilli, N., Ryan, J., Vollman, S., Seshadri, M. (2002). Stress in family practice residents; an exploratory study using art. *Journal of the American Art Therapy Association*. 19:1. 4-11. DOI : 1080/07421656.2002.10129727.
- Kaul, H. K. (2004). Information resources sharing through ill. *The Issues*.
- Kennedy, P., Miele, D. B., Metcalf, J. (2014). The cognitive antecedents and motivational consequences of the feeling of being in the zone. *Consciousness and Cognition*. 30. 48-61. DOI: 10.1015./jconcog2014.07.007
- Lajoie, S. (2008). Metacognition, self regulation and self regulated learning: a rose by any other name? *Educational Psychology Review*. (20) 469-475. DOI: 10.1007/s10648-008=9008-1
- Leedy, P.D., Ormond, J. E. (2005). *Practical research*. Upper Saddle River, New Jersey: Pearson Education.
- Lin, D. T., Liebert, C. A., Tran, J., Lau, J. N., Sallles, A. (2016) Emotional Intelligence as a predictor of resident well- being. *Presented orally at the American College of Surgeons 101, Annual Clinical Congress*. Chicago, Illinois.

- Lucy, C., Souba, C., Taylor, C. (2010). Perspective the problem with the problem of professionalism. *Academic Medicine*. 85, (6). 1018-1024. DOI: 10.1097/ACMobo13e3181:db51f
- Manson, A. (1994). The fate of idealism in modern medicine. *Journal of Medical Humanities*. 15, 153-162.
- Mayer, J. D., Salovey, P., Caruso, D.R. (2004). Emotional intelligence: theory, findings and implications. *Psychological Inquiry*. Vol.15. 3. 197-215.
- Miles, M.B. & Huberman, A. M. (1994). Qualitative data analysis: a sourcebook of new methods (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Mc Call, R. B. (1970). *Fundamental Statistics for Psychology*. New York, New York: Harcourt, Brace & World, Inc.
- Mc Kinley, S. K., Fiedeldey-Van Dijk, C., Smink, D. S. Kent, T.S., Phitayakorn, R., Petrusa, E.R., Mullen, J. T., Scott-Vernaglia, S., Black-Schaffer, S. (2015). A multi-institutional study of the emotional intelligence of resident physicians. *The American Journal of Surgery*. 208. 26-33. DOI: 10.1016/j.amjsurg.2014.09.015
- Mc Kinley, S. K., Fiedeldey-Van Dijk, C., Smink, D. S. Kent, T.S., Phitayakorn, R., Petrusa, E.R., Mullen, J.T., Scott-Vernaglia, S., Black-Schaffer, S. (2014). Are there gender differences in the emotional intelligence of resident physicians? *Journal of Surgical Education*. Vol.7. No. 6. 33-39. DOI: 10.1016/j.surg.2014.05.003
- Morales, J. B. (2014). The relationship between physician emotional intelligence and quality of care. *International Journal of Caring Sciences*. Vol.7.3. 704-710.  
[www.internationaljournalofcaringsciences.org](http://www.internationaljournalofcaringsciences.org)

- Nicolai, J., Demmel, R. (2007). The impact of gender stereotypes on the evaluation of general practitioners' communication skill: an experiential study using transcripts of physician-patient encounters. *Patient Education and Counseling*. 200-205. DOI: 10.1016/j.spec2007/08.013
- O'Neill, T., Lyndale, P., Szakits, K., Fitzgeralds, T. (2016). The value of a brief thought for the day reflection on an academic consult service. DOI: 10.1177/1049909116660518.
- Patrick-Cooper, L., Gallo, J., Gonzales, J., J., Thi Vo, H., Powe, N., B., Nelson, C., Ford, D. (1999). Race, gender, and partnership in the patient –physician relationship. *American Medical Association*. Vol.282. 6. 583-589.
- Petersdorf, R. G. (1992). Are we educating a medical professional who cares? *American Joint Distribution Committee*. 146. 1338-1341.
- Pilkington, A., Hart, J., Bundy, C. (2012). Training obstetricians and gynecologists to be emotionally intelligent. *Journal of Obstetrics and Gynecology*. Vol. 32.10-13. DOI: 10.3109/01443615.2001.623806
- Pineault, R., Borges Da Silva, R., Provost, S., Fournier, M., Prud'homme, A., Levesque, J., F. (2017). Do gender prominent health care organizations have an impact on patient experience of care, use, of services, and unmet needs? *The Journal of Health Care Organization, Provision and Financing*. Vol. 54. 1-9. DOI: 10.1177/0046958017709688.
- Quirk, M. (2006). *Intuition and metacognition in medical education*. New York, New York: Springer Publishing Company, Inc.
- Reed, S., Kassis, K., Nagel, R., Verbeck, N., Mahan, J.J., Shell, R. (2015). Does emotional intelligence predict breaking bad news skills in pediatric interns? A pilot study. *Medical Education Online*.20.1-8. DOI:10.3402/meo.x20.224245

- Robison, A. (1993). *What smart students should know*. New York: Crown.
- Saxena, A., Desanghere, L., Thoma, B., Rajasekaran, S., Kinloch, M., Stauffer, A. (2014).  
Developing competent leaders: insights from chief residents on leadership challenges and  
strategies for success. *Journal of Health Administration Education*. 135-145.
- Schraw, G., Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary  
Educational Psychology*. 19. 460-475.
- Shields, C. (2010). Transformative leadership: working for equity in diverse contexts.  
*Educational Administration Quarterly*. 46(4) 558-589.
- Shunk, D. (2008). Metacognition, self-regulation, and self-regulated learning: research  
recommendations. *Educational Psychology Review*. (20) 463-467. DOI: 10.1007/s10648-  
008-9086-3
- Sperling, R.A., Howard, B.C., Staley, R., DuBois, N. (2004). Metacognition and self –regulated  
learning. *Educational Research and Evaluation*. 10, 117-139.
- Tabachnick, B. G., Fidell, L. S. (2007). *Using multivariate statistics* (5<sup>th</sup> ed). Boston: Pearson  
Education, Inc.
- Talarico, J. F., Varon, A. J., Banks, S.E., Berger, J.S., Pivalizza, E.G., Riveria, G.M., Rimal, J.,  
Davidson, M., Fai, F., Qin, L., Ball, R.D., Schoenberg, C., Metro, D.G. (2011).  
Emotional intelligence and the relationship to resident performance: a multi-institutional  
study. *Journal of Clinical Anesthesia*. 25. 181-187. DOI: 10.1016/j.jclinane.2012..08.002
- Taylor, C., Farver, C., Stoller, J. K. (2011). Can emotional intelligence training serve as an  
alternative approach to teaching professionalism to residents? *Academic Medicine*. (6) 12,  
1551-1554. DOI:10.1097/acm.0b013e31823Saa76



- Trochim, W. M. K., (2006). *Research Methods The Essential Knowledge Base*, (2<sup>nd</sup> ed). Cengage pub.
- Turan, S., Demirel, O., Sayek, I. (2009). Metacognitive awareness and self-regulated learning skills of medical students in different medical curricula. *Medical Teacher*. Vol. 31. DOI: 10.3109/01421590903193521.
- Veenman, M., Wolters., B., Van Hout-Wolters, B.H.A.M., Afflerbach, P. (2006). Metacognition and learning: conceptual and methodological considerations. *Metacognition Learning*. (1) 3-14. DOI: 10.1007/s11409-006-6893-0
- Wear, D. (1998). On white coats and professional development: the formal and hidden curricula. *Annals of Internal Medicine*. 129. 734-737.
- Webb, A. R., Young, R. A., Baumer, J. G. (2010). Emotional Intelligence and the ACGME Competencies. *Journal of Graduate Medical Education*. 508-512.
- Weng, H. C., Steed, J. F., Sheng-Won, Y., Ten-Yi, L., Chin-Chang, H., Tsan, J. Y., Wency, C. (2011). The effect of surgeon empathy and emotional intelligence on patient satisfaction. *Advances in Health Science Education*. 16: 591-600. DOI: 10.1007/s10459-011-9278-3
- Wheatley, M. J. (1999). *Leadership and the new science*. San Francisco, CA: Berrett-Koehler, Inc.
- Williams, C. (2007). *Journal of Business & Economic Research*. (5) 1. p.66.

## **Research Study Participants, Information, Confidentiality Protection**

### **Appendix A.**

#### **Participants**

Family Practice Residents in training at St. Luke's University Health Network are the subject group for this study. Residents from residency years one, two and three may participate in this study.

#### **Information Collected**

Residents age, gender, reflective practice score, emotional intelligence score and metacognitive score will be collected in this study. A number will be assigned to each resident participating in this study in order to maintain confidentiality while taking the assessments. Identification of the individual utilizing the assigned number method will ensure accurate tracking of the residents results in the assessment and maintain confidentiality of the participating resident.

#### **Access to Information/Confidentiality Protection**

All electronic files will be stored in a database on a locked computer which only this researcher has access through a password and individual identifying name. All paper assessment results will be kept under lock and key in the possession of the researcher only. After the results of the data is published the data will be stored on an encrypted thumb drive and placed in a safe at the residence of the researcher. This safe is fireproof and in an electronically secured residence. The data will be kept for ten years in this location. After one decade, the thumb drive will be destroyed at a bonded company specializing in shredding of documentation devices.

## Research Study Consent Form

### Appendix B.

#### St. Luke's University Health Network

#### Permission to Take Part in a Human Research Study

#### Short Form

Page 1 of 3

***You are being asked to take part in a research study.***

***Before you agree to take part, someone will explain to you:***

- That the study involves research
- The purposes of the research
- How long you will be in the research
- What will happen to you
- What is experimental
- Risks or discomforts to you
- Benefits to you or others
- Other choices you might have
- Who will see your information
- You volunteer to be in a research study
- Whether or not you take part is up to you
- You can choose not to take part in the research study
- You can agree to take part now and later change your mind
- Whatever you decide it will not be held against you
- If you have questions, concerns, or complaints, or think the research has hurt you, you have been provided with the appropriate contacts and their contact information.
- This research has been reviewed and approved by an Institutional Review Board. You may talk to them at 484-526-4944 or [medaffairs@slhn.org](mailto:medaffairs@slhn.org) for any of the following:
  - Your questions, concerns, or complaints are not being answered by the research team
  - You cannot reach the research team
  - You want to talk to someone besides the research team
  - You have questions about your rights as a research subject
  - You want to get information or provide input about this research

***When applicable, someone will explain to you:***

- Whether you will get treated or paid if injury occurs
- The possibility of unknown risks
- When you may be taken off the research without your agreement
- Added costs from taking part
- What will happen if you stop taking part
- Steps to safely stop taking part
- When new information will be told to you
- The number of people expected to take part in the research
- That the Food and Drug Administration may inspect the records
- What happens to collected data if you stop taking part
- An explanation of [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov)

***[There are two signature pages attached to this template consent. Use the signature page or pages appropriate for your study. The IRB recommends that you make separate consent documents for each signature page to be used.]***

**St. Luke's University Health Network****Permission to Take Part in a Human Research Study**

Page 2 of 3

**. Signature Block for Capable Adult**

Your signature documents your permission to take part in this research.

\_\_\_\_\_  
Signature of subject\_\_\_\_\_  
Date\_\_\_\_\_  
Printed name of subject\_\_\_\_\_  
Signature of person obtaining consent\_\_\_\_\_  
Date\_\_\_\_\_  
Printed name of person obtaining consent

My signature below documents that the information in the consent document and any other written information was accurately explained to, and apparently understood by, the subject, and that consent was freely given by the subject.

\_\_\_\_\_  
Signature of witness to consent process\_\_\_\_\_  
Date\_\_\_\_\_  
Printed name of person witnessing consent process

**St. Luke's University Health Network**  
**Permission to Take Part in a Human Research Study**

Page 3 of 3

**Signature Block for Adult Unable to Consent**

Your signature documents your permission for the named subject to take part in this research.

---

Printed name of subject

---

Signature of legally authorized representative

---

Date

---

Printed name of legally authorized representative

---

Signature of person obtaining consent

---

Date

---

Printed name of person obtaining consent

My signature below documents that the information in the consent document and any other written information was accurately explained to, and apparently understood by, the subject, and that consent was freely given by the subject.

---

Signature of witness to consent process

---

Date

---

Printed name of person witnessing consent process

## Metacognitive Assessment Inventory (MAI)

### Appendix C.

#### METACOGNITIVE ASSESSMENT INVENTORY

We would like you to respond to the questions in this packet by indicating how true or false each statement is about you. If a statement is always true, write the number 5 in the blank provided to the right of each statement. Your responses are scored anonymously, so please answer as truthfully as you can.

- | ALWAYS<br>FALSE | SOMETIMES<br>FALSE | NEUTRAL | SOMETIMES<br>TRUE | ALWAYS<br>TRUE |   |
|-----------------|--------------------|---------|-------------------|----------------|---|
| 1               | 2                  | 3       | 4                 | 5              |   |
| ___             |                    |         |                   |                | 1. I ask myself periodically if I am meeting my goals.                    |
| ___             |                    |         |                   |                | 2. I consider several alternatives to a problem before I answer.          |
| ___             |                    |         |                   |                | 3. I try to use strategies that have worked in the past.                  |
| ___             |                    |         |                   |                | 4. I pace myself while learning in order to have enough time.             |
| ___             |                    |         |                   |                | 5. I understand my intellectual strengths and weaknesses.                 |
| ___             |                    |         |                   |                | 6. I think about what I really need to learn before I begin a task.       |
| ___             |                    |         |                   |                | 7. I know how well I did once I finish a test.                            |
| ___             |                    |         |                   |                | 8. I set specific goals before I begin a task.                            |
| ___             |                    |         |                   |                | 9. I slow down when I encounter important information.                    |
| ___             |                    |         |                   |                | 10. I know what kind of information is most important to learn.           |
| ___             |                    |         |                   |                | 11. I ask myself if I have considered all options when solving a problem. |
| ___             |                    |         |                   |                | 12. I am good at organizing information.                                  |
| ___             |                    |         |                   |                | 13. I consciously focus my attention on important information.            |
| ___             |                    |         |                   |                | 14. I have a specific purpose for each strategy I use.                    |
| ___             |                    |         |                   |                | 15. I learn best when I know something about the topic.                   |
| ___             |                    |         |                   |                | 16. I know what the teacher expects me to learn.                          |
| ___             |                    |         |                   |                | 17. I am good at remembering information.                                 |

- \_\_\_ 18. I use different learning strategies depending on the situation.
- \_\_\_ 19. I ask myself if there was an easier way to do things after I finish a task.
- \_\_\_ 20. I have control over how well I learn.
- \_\_\_ 21. I periodically review to help me understand important relationships.
- \_\_\_ 22. I ask myself questions about the material before I begin.
- \_\_\_ 23. I think of several ways to solve a problem and choose the best one.
- \_\_\_ 24. I summarize what I've learned after I finish.
- \_\_\_ 25. I ask others for help when I don't understand something.
- \_\_\_ 26. I can motivate myself to learn when I need to.
- \_\_\_ 27. I am aware of what strategies I use when I study.
- \_\_\_ 28. I find myself analyzing the usefulness of strategies while I study.
- \_\_\_ 29. I use my intellectual strengths to compensate for my weaknesses.
- \_\_\_ 30. I focus on the meaning and significance of new information.
- \_\_\_ 31. I create my own examples to make information more meaningful.
- \_\_\_ 32. I am a good judge of how well I understand something.
- \_\_\_ 33. I find myself using helpful learning strategies automatically.
- \_\_\_ 34. I find myself pausing regularly to check my comprehension.
- \_\_\_ 35. I know when each strategy I use will be most effective.
- \_\_\_ 36. I ask myself how well I accomplished my goals once I'm finished.
- \_\_\_ 37. I draw pictures or diagrams to help me understand while



learning.

- \_\_\_ 38. I ask myself if I have considered all options after I solve a problem.
  - \_\_\_ 39. I try to translate new information into my own words.
  - \_\_\_ 40. I change strategies when I fail to understand.
  - \_\_\_ 41. I use the organizational structure of the text to help me learn.
  - \_\_\_ 42. I read instructions carefully before I begin a task.
- 
- \_\_\_ 43. I ask myself if what I'm reading is related to what I already know.
  - \_\_\_ 44. I re-evaluate my assumptions when I get confused.
  - \_\_\_ 45. I organize my time to best accomplish my goals.
  - \_\_\_ 46. I learn more when I am interested in the topic.
  - \_\_\_ 47. I try to break studying down into smaller steps.
  - \_\_\_ 48. I focus on overall meaning rather than specifics.
  - \_\_\_ 49. I ask myself questions about how well I am doing while I am learning something new.
  - \_\_\_ 50. I ask myself if I learned as much as I could have once I finish a task.
  - \_\_\_ 51. I stop and go back over new information that is not clear.
  - \_\_\_ 52. I stop and reread when I get confused.



## Groningen Reflective Ability Scale (GRAS)

### Appendix D.

#### Groningen Reflective Ability Scale

Here are some statements about your learning and functioning in practice. Using the 1-5 scale below, please indicate what *really reflects* your approach, rather than what you think your experience should be. Please consider each item separately.

1. I want to know why I do what I do

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

2. I am aware of the emotions that influence my behavior

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

3. I do not like to have my clinical decisions discussed

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

4. I do not welcome remarks about my personal functioning

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

5. I take a closer look at my own habits of thinking

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

6. I am able to view my own behavior from a distance

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

7. I test my own judgments against those of others

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

8. Sometimes others say that I do overestimate myself

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

9. I find it important to know what certain rules and guidelines are based on

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

10. I am able to understand people with a different cultural / religious background

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

11. I am accountable for what I say

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

12. I reject different ways of thinking

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

13. I can see an experience from different standpoints

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

14. I take responsibility for what I say

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

15. I am open to discussion about my opinions

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

16. I am aware of my own limitations

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

17. I sometimes find myself having difficulty in illustrating an ethical standpoint

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

18. I am aware of the cultural influences on my opinions

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

19. I want to understand myself

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

20. I am aware of the possible emotional impact of information on others

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

21. I sometimes find myself having difficulty in thinking of alternative solutions

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

22. I can empathize with someone else's situation

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1

23. I am aware of the emotions that influence my thinking

<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
5	4	3	2	1